A.4.1

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

February 22, 1994

TO: Dan Dailey, Environmental Engineer, Hazardous Waste Permits Unit, Waste Management Division

Elaine Bennett, Environmental Quality Analyst, Technical Support Unit, WMD

FROM: Allan Taylor, Geologist, Technical Support Unit, Waste Management Division Allan B. Taylor

SUBJECT: GMC AC Rochester - MID 980 568 620
Engineering Complex Hazardous Waste Storage Pad Closure Plan Amendment, Assessment Summary and Work Plan for Remedial Activities

A review of the GMC AC Rochester Engineering Complex Hazardous Waste Storage Pad Closure Plan Amendment, Assessment Summary and Work Plan for Remedial Activities has been completed.

This report was received by this office on March 29, 1993. At WMD request, Techna provided the well logs for this report on January 31, 1994.

This document contains substantial administrative and technical deficiencies which must be addressed prior to approving closure plan amendment and work plan for remediation.

In general, the facility has not defined the extent of soil or groundwater contamination which has resulted from the container storage unit. The facility has proposed a groundwater collection system with the objective of achieving clean closure at some future date. The facility has not proposed any active remediation of contaminated soils.

Due to the presence of a significant groundwater contamination problem at this facility, it is recommended that we have the facility submit a work plan to implement an interim measure groundwater collection system to stabilize the existing plume of contamination and to begin reducing the mass of contamination present within the aquifer. As noted in the following comments, the current proposal for a groundwater collection system is not acceptable.

For your convenience, these comments have been saved on the X drive under the DAILEY subdirectory. The file name is ACROCH.WP.

1) The facility has proposed to conduct remediation for an extended period of time (five years or more) under the closure plan with the goal of achieving a Type B "clean

closure." Based on consultation with De Montgomery and Steve Buda, it is my understanding that closure activities of this duration must be conducted under the control of a post closure permit or a consent order. If clean closure is achieved, then the permit or order can be terminated.

2) The facility has proposed to remediate groundwater by conventional pump and treat technology and to clean up contaminated soils by "passive biological and oxidative degradation of soil contaminants." There is no objection to the use of pump and treat technology to contain the plume and to reduce the mass of contamination in the groundwater. However, the proposal for "passive remediation" of soils is unacceptable for the following reasons:

   a) The facility has not shown that 1,1,1-Trichloroethane (1,1,1-TCA) will degrade in soils. Howard (1990) reports that 1,1,1-TCA does not degrade or degrades very slowly in soils.

   b) The relatively high concentrations of 1,1,1-TCA in soils in both the saturated and unsaturated zones will continue to act as a source of groundwater contamination during aquifer remediation and slow (or prohibit) the remediation of the aquifer.

   c) The degradation product of 1,1,1-TCA in groundwater and soils is 1,1-Dichloroethene (1,1-DCE). 1,1-DCE is significantly more toxic than 1,1,1-TCA. For comparison, the Act 307 Type B values for 1,1,1-TCA are 200 ppb for groundwater and 4000 ppb for soils. The 1,1-DCE values are 7 and 200 ppb for groundwater and soil, respectively. 1,1-DCE is already present in groundwater at levels which significantly exceed the applicable groundwater clean up numbers. Failure to remove the source (1,1,1-TCA) will only result in prolonging the cleanup of the more toxic degradation product.

A strategy for "passive" remediation of 1,1,1-TCA is inconsistent with a achieving clean closure at this facility. "Passive remediation" would only be acceptable if proposed in as part of a post closure/type C containment strategy.

3) The facility must provide a site map which locates the container storage facility relative to the facility boundary;

identifies any surface water bodies (or other discharge areas) where contaminated groundwater may vent; and the location of any domestic wells which may be proximal to the facility.

4) The report must provide more information on the underground utilities which are shown on the site diagram. The report needs to specify the invert elevations of the utilities and review the potential for the utilities to act as conduits for the migration of contaminants.

5) The report must provide more detail on the source(s) of the contamination problem(s). How and when did the releases occur? Does GM know what and where the source areas are?

6) The well logs (Appendix A) must be revised or supplemented to provide additional detail on the construction of the wells. The current well logs lack the following information: top of ground surface; protective casing information; description of how the wells were completed (flush or stick up); casing material; elevation of sand pack and seals; date(s) top of casing elevations were shot; etc.)

7) The facility must resolve the discrepancy between the groundwater contour map submitted in the November 10, 1992 letter to Dan Dailey and the groundwater contour map presented in the Closure Plan Amendment (Figure 7). The depicted ground water flow regimes are different for these two maps for the same measurement date (correction to top of casing for OB-12?). See also comment 13 relating to the groundwater model.

8) The report needs to more completely define groundwater flow direction(s) using additional static water level measurements from different seasons. Additional monitoring points are necessary verify the direction of groundwater flow and the extent of contamination from this facility. Monitoring wells/piezometers are needed south of the unit, west of OB-6 of the facility and north east of monitoring well OW-4.

9) The report incorrectly depicts the inferred extent of soil contamination. The inferred extent appears to be based mainly on the analysis of samples which were collected from shallow (less than 12 feet below grade) borings. The extent of soil (or groundwater) contamination has not been defined at depths greater than 12 feet. Soil samples were collected deeper than 12 feet in only two locations. The samples collected near the water table or below the water table contained the highest concentrations of soil contamination detected in the investigation.

The facility must either define the extent of soil contamination (saturated and unsaturated) and/or demonstrate a clearly decreasing trend of soil contamination which is below the applicable Type B soil cleanup criteria.

10) The extent of groundwater contamination has not been defined (or a clearly decreasing trend below applicable Type B values has not been established) to the south, west or east of the of the regulated unit. The facility must define the extent of groundwater contamination and/or demonstrate a clearly decreasing trend below applicable Type B groundwater criteria. Specifically, the following issues need to be clarified and resolved:

    a) Some of the highest levels of groundwater contamination detected during this assessment occurred at OW-6, which (according to existing data) is upgradient of the container storage area. There is no data to define the extent of contamination to the west of this well.

    b) Soil samples collected near the top of the water table from OB-2 contained the highest levels of soil contamination encountered during this assessment. However, relatively low levels of groundwater contamination have been identified in this well. In contrast, data from OB-1 shows similar levels of soil contamination and high levels of groundwater contamination.

    c) Groundwater results from OW-9 and OW-1 are inconsistent. Concentrations of 1,1,1-TCA in groundwater from OW-9 range between 9000 and 37 ppb in two sampling events which are 5 months apart. Groundwater monitoring data from OB-1 range in concentration from 40,000 to 4000 ppb of 1,1,1-TCA between two separate sampling events.

    WMD will need to conduct a split sampling event with this facility to confirm the above results.

11) The facility must provide the data plots (and well construction information - see comment 6) of the data which is presented in Appendix E so that the estimates of hydraulic conductivity can be verified.

12) More information must be provided on the capture zone predicted by the "Flowpath" groundwater model. Please indicate what the limits of the capture zone are on Figures 11 and 12. The structures illustrated on the grid (Figure 10) must be defined and their functions (if any) must be described.

13) The shape of the predicted capture zone(s) do not appear to be

consistent with the groundwater flow regime depicted on Figure 7. The capture zone appears to be larger downgradient of the modeled purge system. It appears that the model may have been constructed based on groundwater elevation data presented in the November 10, 1992 letter to Dan Dailey (see comment 7 above).

14) The facility proposes to pump a deep observation well (OB-7) in order to achieve groundwater capture at the facility. Existing chemical monitoring data indicates that the deep monitoring wells are much less contaminated that the shallow wells. Pumping from a deep well will expand the vertical extent of contamination by causing highly contaminated groundwater to flow downward in the aquifer and mix with relatively uncontaminated groundwater. This proposal is not acceptable as it will expand the vertical extent of groundwater contamination. Groundwater collection will have to be conducted within the known zone of contamination.

15) The proposal to perform confirmation sampling of impacted soils following aquifer remediation is not acceptable or appropriate at this time. The facility has not defined the extent of soil contamination and has not proposed any remediation of the identified impacted soils.

This concludes my comments. Due to the extensive nature of the deficiencies identified during this review it is probable that the facility will want to meet to discuss these issues. Contact me if you have any questions or concerns regarding this review.

Reference: Howard, Phillip, H.; <u>Handbook of Environmental Fate and Exposure Data</u>; Vol. 2; MI: Lewis (1990).

cc: Ms. De Montgomery/U.S.EPA Reporting
Ms. Liz Browne, Shiawassee Distict Office
Mr. Steve Buda/HWP-C&E File

ORIG: KEN/STEVE BUDA/ C + E
XC: BOB BASCH
EPA
RICH TRAUB

SLIVER WILL REVIEW

TECHNA CORPORATION

Knowledge, and the Creativity to Use It

44808 Helm St. Plymouth, MI 48170 (313) 454-1100 Fax. 454-1233

RECEIVED
MAY 07 1990
Waste Management Division

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

May 3, 1990

Mr. Steven R. Sliver
Environmental Engineer
Waste Management Division
Department of Natural Resources
Stevens T. Mason Building
P.O. Box 30028
Lansing, Michigan 48909

Re: Closure of Interim Status UST #5009 (MID 980 568 620)

Dear Mr. Sliver:

Techna Corporation, on behalf of the AC Rochester Division of General Motors Corporation, has prepared the attached closure plan for the interim status underground hazardous waste fuel storage tank (UST #5009; MID 980 568 620) located at the Engineering Complex, 1300 North Dort Highway, Flint, Michigan. This closure plan has been prepared in response to the exclusion of the subject tank from the recent approval of the previous Engineering Complex interim status hazardous waste storage area closure plan. Subsequent to the submission of the previous closure plan, additional information about the construction and use of UST #5009 has been collected. This new data is presented in the attached closure plan in support of AC Rochester's proposed closure strategy.

If you have any questions concerning the attached closure plan, please do not hesitate to contact Ms. Susan Kelsey at Ac Rochester or me.

Very truly yours,

TECHNA CORPORATION

J M Harless

James M. Harless, Ph.D.
President

JMH/js
enclosures (3)
cc: Ms. Susan Kelsey, AC Rochester

EPA Reporting

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

September 25, 1989

TO: Steve Sliver, Permits Engineer

FROM: Al Taylor, Geologist, Geotechnical Support Unit ABT

SUBJECT: GM AC Rochester Division, Engineering Complex, Hazardous Waste Storage Area Closure Plan Review MID 980 568 620

GM AC Spark Plug Div. Flint, MI

A hydrogeologic review of the GM AC Rochester, Engineering Complex Hazardous Waste Storage Area Closure Plan has been completed. This closure plan document is dated August 6, 1989. A site visit was conducted at this facility on September 7, 1989.

This closure plan addresses three separate closures: 1) The container storage area; 2) Waste oil storage tank; 3) Waste gasoline underground storage tank. The following comments are directed to each of these closure areas:

<u>Container Storage Area/Flammable Storage Building</u>

1) Section 5.1. If analysis of samples from below 5 feet is warranted, care must be taken that holding times of VOA samples are not exceeded.

2) Section 5.8. EPA method 8240 is not acceptable for analysis of VOA's due to increased detection limits.

3) The detection levels presented in Table 4 for Priority Pollutant Volatile Organics are unacceptable. A copy of acceptable detection levels is attached to this document. These detection levels are approximately twice that obtainable by the MDNR laboratory. Again EPA method 8240 is not considered a acceptable method of analysis for closure due to increased detection limits.

4) Section 5.9. The plan specifies that soil contamination will be determined using the Gosset t-test at the 99% confidence level to compare background data to the suspect samples. Any statistically significant increase in contaminant concentration above background will indicate soil contamination.

   In this case it would be preferable to use the mean and the variance of the background data to establish an upper limit for determining significant concentrations. The MDNR "How Clean is Clean" guidance document recommends

X + 3S of "background data" as the maximum allowable limit, where 3S equals three times the standard deviation, and X equals the mean. The advantage of this statistical test over Gosset's t-test is that it requires only one sample per station.

5) Section 6.0. This section specifically does not address action which would be taken if contamination is detected underneath the storage pad.

Waste Oil Tank Closure

During the September 9, 1989 site visit Susan Kelsey indicated that this tank and the former waste oil tank had never contained hazardous waste. An attempt would be made to administratively remove this unit from Act 64 closure requirements.

The current closure strategy for the waste oil tank is not acceptable to demonstrate clean closure. Significant revisions in sampling frequency, detection limits and parameters would be necessary to document clean closure if clean closure of this unit becomes necessary.

Waste Gasoline Underground Storage Tank

The waste gasoline underground storage tank is part of a larger underground tank farm. This underground tank farm is currently listed as an active Michigan Act 307 site. Benzene and gasoline contamination of soil and groundwater has resulted from the past leaking of underground tank(s) and ancillary equipment. Two contaminated aquifers are currently undergoing remediation by purge wells/sumps. Purge water is discharged to the plant wastewater treatment facility.

Ben Hall of the Lansing District Office is the ERD contact.

It does not appear to be possible or prudent to attempt to clean close this individual tank in the thoroughly contaminated tank farm area. Further, it is not possible to separate contamination which potentially originated from the hazardous waste tank and ancill ry equipment from contamination which has originated from other portions of the tank farm. The most reasonable approach appears to be to tie the closure of this tank in with the remediation of the entire tank farm area.

1) The existing hydrologic information which was submitted with this plan (Report on Field Investigation - 1986/1987) has been reviewed. The following concerns with regard to remediation of this site as well as the

closure of the hazardous waste tank are noted:

a) Three additional wells have been completed since this report was submitted: P-17, P-18, and P-19. The location and function of these additional wells should be included in future data submittals.

b) The extent of contamination in the upper granular unit (aquifer) has not been clearly defined in the downgradient direction. A groundwater low in the vicinity of P-14U may be controlling and limiting ground water flow in the northern and western directions. The limits of contamination, however, must be clearly defined with soil borings/monitoring wells.

c) The extent of contamination in the lower aquifer (both shallow and deep) needs to be defined more accurately. This aquifer is a significant water resource.

Contamination has not been defined in the downgradient direction(s) of the lower aquifer. Groundwater velocity calculations suggest that contamination should not be widespread. The limits of contamination, however, must be clearly defined with soil borings/monitoring wells.

Contamination has been detected in P16-L. Contamination has not been detected in P16-U which is screened in the upper granular unit and is downgradient relative to P16-L. This suggests that an additional source of contamination may be present upgradient of P-16L in the lower aquifer.

Determining the extent of contamination in both aquifers is critical in order to assure that the existing groundwater remediation program is adequate to capture all contamination.

d) Groundwater quality in the deeper portions of lower aquifer should continue to be monitored to ensure contamination is not moving downward.

2) Concerns not related to the hydrogeologic review include:

a) Documentation that the existing hazardous waste tank is double walled (secondary containment) has not been presented in the closure plan. This verification needs to be provided.

b) The existing closure strategy of rinsing out the tank and then putting the tank back into service is not logical unless this process is part of routine tank maintenance. This process in itself is not adequate to demonstrate clean closure.

This concludes my review. Please let me know if you have any questions or concerns.

c.c. EPA Reporting (De Montgomery)
C & E File
Lansing District Office
Geotech

TABLE 4

SUMMARY OF ANALYTES, ANALYSIS METHODS AND METHOD DETECTION LIMITS

Analyte	SW-846 Method	Soil Method Detection Limit (ug/kg)
Priority Pollutant Volatile Organic Compounds		
Bromodichloromethane	8010	10.0
Bromoform	8010	20.0
Bromomethane	8010	----
Carbon tetrachloride	8010	18.0
Chlorobenzene	8010	90.0
Chloroethane	8010	52.0
2-Chloroethylvinyl ether	8010	13.0
Chloroform	8010	18.0
Chloromethane	8010	8.0
Dibromochloromethane	8010	9.0
1,2-Dichlorobenzene	8010	200.0
1,3-Dichlorobenzene	8010	200.0
1,4-Dichlorobenzene	8010	200.0
Dichlorodifluoromethane	8010	-----
1,1-Dichloroethane	8010	18.0
1,2-Dichloroethane	8010	18.0
1,1-Dichloroethene	8010	18.0
trans-1,2-Dichloroethene	8010	18.0
1,2-Dichloropropane	8010	18.0
cis-1,3-Dichloropropene	8010	34.0
trans-1,3-Dichloropropene	8010	34.0
Methylene chloride	8010	90.0
1,1,2,2-Tetrachloroethane	8010	18.0
Tetrachloroethene	8010	18.0
1,1,1-Trichloroethane	8010	18.0
1,1,2-Trichloroethane	8010	18.0
Trichloroethene	8010	18.0
Trichlorofluoromethane	8010	----
Vinyl chloride	8010	18.0
Benzene	8020	18.0
Ethylbenzene	8020	18.0
Toluene	8020	18.0
Xylenes	8020	18.0

AC Rochester

1300 N. Dort Highway
Flint, Michigan 48556 USA

August 7, 1989

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Steven R. Sliver
Environmental Engineer
Waste Management Division
Department of Natural Resources
Stevens T. Mason Building
P.O. Box 30028
Lansing, Michigan 48909

RECEIVED
AUG 8 1989
Waste Management
Division

Dear Mr. Sliver:

Techna Corporation, on behalf of AC Rochester, has prepared the attached revised closure plan for the interim status hazardous waste storage area (MID 980 568 620) located at the Engineering Complex in Flint, Michigan. The revised closure plan has been prepared in response to your June 27, 1989 Notice of Deficiency letter concerning the original submission of October 14, 1988. A summary of plan revisions and responses to your comments are presented below:

1. The requested discussion has been added to the introduction to Section 3.0.

2. Available pertinent information concerning the closure of the original waste oil tank has been included in Appendix B.

   Sampling of soils around the original tank is not feasible at this time, as it was not when the tank was closed. The tank lies partially beneath the foundation footings of the adjoining (east) building and partially beneath the adjoining (west) concrete pipe chase. The space between the building and the chase is not accessible to drilling equipment needed to collect soil samples from sufficient depths to assess the tank. The proposed soil boring location west of the concrete chase (B-10, Figure 6) will allow collection of samples within approximately 15' of the original tank.

3. As stated in Sections 2.2.3 and 3.5 the scrap fuel (gasoline) tank is located in a tank farm containing twenty three (23) underground, flammable materials storage tanks and the groundwater from the tank farm is being remediated due to a discharge of benzene. Therefore, soils sampling and excavation is not feasible or necessary for the following reasons:

   - Due to the presence of piping, other tanks and flammable liquids, neither soil sampling at the necessary depths nor excavation of soils can be performed safely;

- The subject tank has been certified usable and leak free according to 40 CFR 265.191;

- Subsurface contamination from the known benzene discharge and suspected fuel spills and leaks would make it virtually impossible to determine if possible contamination from soil samples collected near the scrap fuel tank arose from waste management activities in the tank;

- The groundwater remediation currently in progress at the fuel farm will collect any contaminants that may have entered the environment as a result of waste management activities and will adequately protect human health and the environment as required in 40 CFR 265.111.

A summary of information about the remediation program at the fuel farm has been included in the closure plan (Appendix B).

4. Revised as requested.

5. The two waste storage tanks have been certified in accordance with 40 CFR 265.191 (See Appendix C). Since there is no regulatory requirement for re-certification, the tanks will be returned to service immediately after cleaning, assuming that there is no other reasonable evidence to indicate leakage.

6. Revised as requested.

7. Revised as requested.

8. Section 4.6 and Table 4 have been modified to describe criteria for managing decontamination rinsates and provide analysis methods/method detection limits, respectively.

9. Section 4.6 has been revised to include a description of the contaminant removal processes at the AC Rochester-Flint wastewater treatment plant.

10. Sampling beneath the concrete chase containing the waste oil tank would be neither safe nor feasible. The chase contains numerous flammable fuel pipes and tanks. It is approximately eighteen (18) feet deep, and therefore not accessible to the boring equipment that will be used for the closure sampling. The boring proposed for the area west of the chase will be only 8' - 12' from the center of the chase; this is less than the twenty-foot spacing specified in the MDNR "how Clean is Clean" guidance and is sufficiently close to reveal significant environmental degradation resulting from waste management activities in the tank. Furthermore, the concrete chase serves only as secondary containment for the tank, the tank has been certified in accordance with 40 CFR 265.191, and there have been no known releases of waste oil from the tank.

    The sample locations under the container storage pad (B-8 and B-9, Figure 5) were selected to adjoin the catch basins, the lowest point in the pad, as described in Section 5.1 of the original work plan. Soils under these basins have the highest probability of being contaminated. Furthermore, since these sample locations are in the center of the pad, equi-distant from all sides, sufficient, representative assessment data will be obtained from the soil samples from these borings. Additional borings do not appear justified.

11. Revised as requested.

12. Assessment of the drainage system was included in the original plan as described in Section 3.3 and shown in Figure 4, borings B-2 and B-4. The text has been revised to make this more easily understood.

13. Revised as requested.

14. Revised as requested.

15. Revised as requested.

Additional Revisions:

A. The depths from which soil samples will be collected near the container storage pad (Sections 5.1 and 5.2) have been slightly modified. The sampling interval has been changed to 2' from the original 1' in the upper levels for logistical reasons. The split spoon sampler is 18" long, which makes sample collection at 1' intervals difficult. The total depth of each borehole has not changed.

   The depth from which soil samples will be collected near the concrete chase containing the waste oil tank have also been modified as above. The maximum depth of sample collection has been changed to five (5) feet below the bottom of the chase or until a saturated zone is encountered. This change is the result of new information indicating that the depth to the uppermost saturated zone is 10'- 15'.

B. No sampling of the wastewater treatment plant effluent will occur during the processing of the decontamination wash waters. Since the treatment plant processes approximately 1.2 million gallons of wastewater per day, the impact of 2,000 - 4,000 gallons of wash water would be impossible to discriminate. Furthermore, it would be impossible to know when the actual wash water was being processed.

If you have any additional questions concerning the attached revised closure plan or the rationale for responses to your deficiency letter, please do not hesitate to contact Dr. James M. Harless at Techna or me.

Sincerely yours,

Susan D. Kelsey

Susan D. Kelsey
Senior Environmental Engineer

enclosures (4)

cc: Dr. James M. Harless, Techna

A.4.2

Please File
in PART A
MID 980 568 620

TECHNA
CORPORATION

GENERAL MOTORS CORPORATION
AC ROCHESTER DIVISION
ENGINEERING COMPLEX

UNDERGROUND HAZARDOUS WASTE STORAGE TANK CLOSURE PLAN

AC Rochester Division
Engineering Complex
General Motors Corporation
1300 North Dort Highway
Flint, Michigan 48556

MID 980 568 620

TPN: 202-8001

March 27, 1990

TABLE OF CONTENTS

GENERAL MOTORS CORPORATION
AC ROCHESTER DIVISION
ENGINEERING COMPLEX

UNDERGROUND
HAZARDOUS WASTE STORAGE TANK
CLOSURE PLAN

1.0 INTRODUCTION

This closure plan has been developed for the underground waste gasoline storage tank located in the Engineering Complex (MID 980 568 620) of the AC Rochester Division of General Motors Corporation, Flint, Michigan. An underground hazardous waste storage tank has been included in the Engineering Complex Part A interim status application since submission of an initial permit application dated November 17, 1980. Requests to amend the interim status permit were submitted to the Michigan Department of Natural Resources (MDNR) in October 1988 and August and October 1989. These amendments removed storage units that were part of the plant wastewater treatment system and which never held hazardous waste; all of these units were exempt from regulation under Michigan Act 64 and RCRA/HSWA.

An interim status UST has been used only since 1986 for the storage of waste gasoline (D001) generated from the testing of automotive parts. Prior to 1986 the unaltered fuel was not discarded, but was collected in a product gasoline UST and subsequently used as fuel for plant vehicles. The interim status designation for a waste gasoline UST was a protective filing and was not applicable to actual waste management activities prior to 1986 because no waste gasoline was generated. Although some storage of the waste gasoline has exceeded 90 days since 1986, AC Rochester now accumulates the waste for <90 days and intends to do so in the future. Therefore, the facility's management wishes to clean close this tank and thus remove it from interim status.

An interim status clean closure plan for both the container storage area and the waste gasoline underground storage tank (UST) was submitted on October 14, 1988, and was subsequently approved as amended, with stipulations, by the Michigan Department of Natural Resources on January 23, 1990. However, the approved closure plan specifically <u>excluded</u> closure of the UST. The UST was excluded from closure because 1) it is located in an area of known contamination, 2) subsurface sampling is not feasible due to the presence of other tanks and pipes containing flammable liquids, and 3) available data could not support closure without sampling.

This clean closure plan has been developed on the basis of additional information about the tank's construction and the duration of tank usage for hazardous waste storage. Closure activities for the Engineering Complex hazardous waste UST will consist of an extensive internal cleaning. The tank will then be returned to service, and rinse waters will be properly disposed.

2.0 SITE DESCRIPTION AND HISTORY

The original Part A permit application was submitted in 1980 under the name of the GMC AC Spark Plug Division, Engineering Complex. The name and management of the plant has recently been changed to the AC Rochester Division of General Motors Corporation.

The Part A permit application was amended and submitted to the Michigan Department of Natural Resources in October 1988, August 8, 1989 and again on or about October 4, 1989 to correct misinterpretations of the regulations in the original application, to correctly show the areas actually being used to manage hazardous wastes, and to more accurately describe the types of wastes being managed.

2.1 Location

The Engineering Complex of the AC Rochester Division is located at 1601 North Averill Avenue, Flint, Michigan (see Location and Site Pans in Appendix A). The plant contact for all inquiries concerning the interim status storage area closure program is Ms. Susan Kelsey (313/257-6595).

The interim status UST, identified as UST #5009, is located in the northwest corner of a tank farm sited south of Buildings 5126 and 5179 (Figures 1 and 2, tank #9). This tank farm contains 22 other USTs which hold gasoline, benzene and a variety of other fuel components.

2.2 Site and Waste Storage Unit History

The original Part A permit application of November 17, 1980 included a designation for tank storage of flammable (D001) waste fuels. At this time, the hazardous waste regulations were very new, and there was considerable misunderstanding about the designation of waste materials and the

FIGURE 1

SITE DIAGRAM

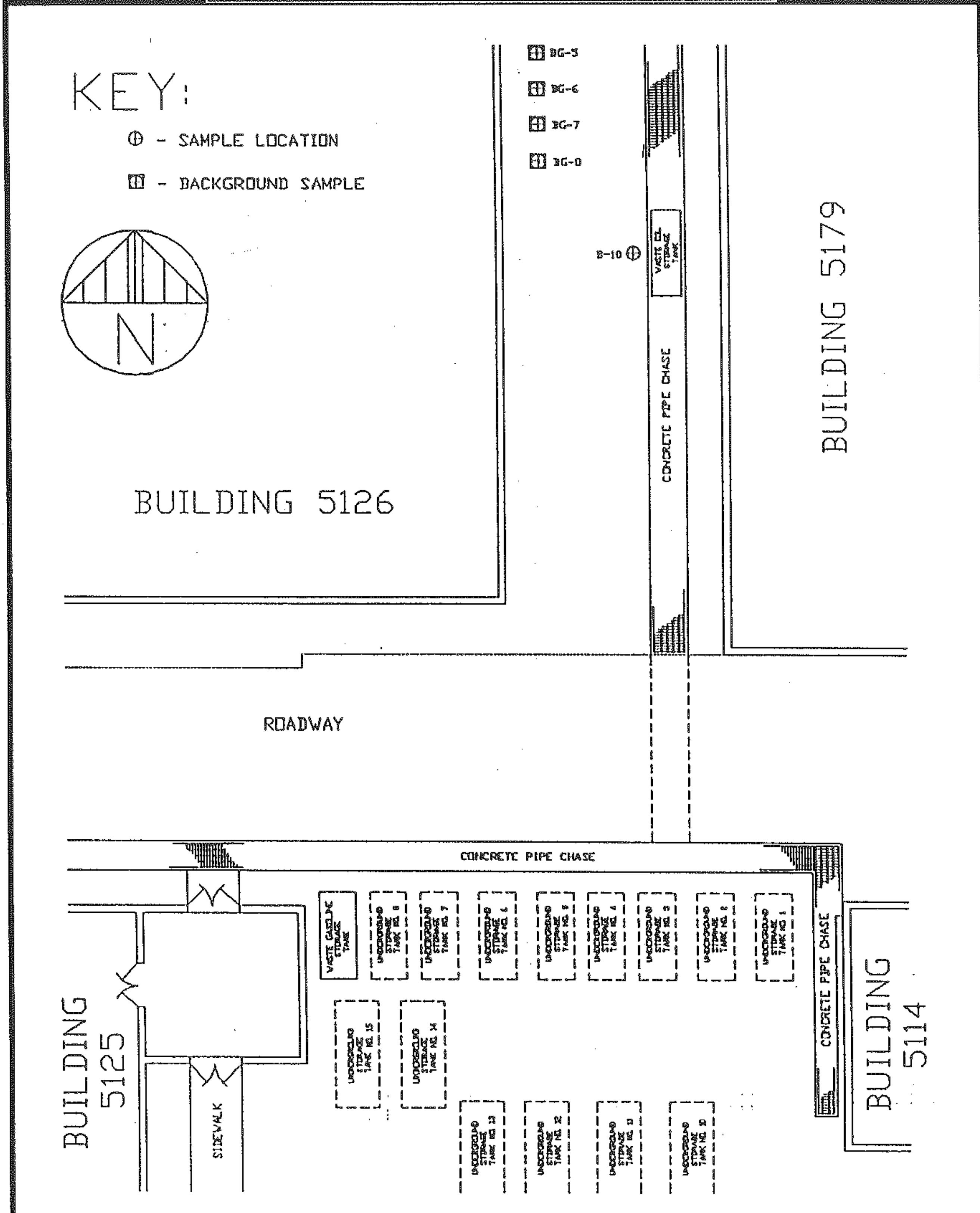
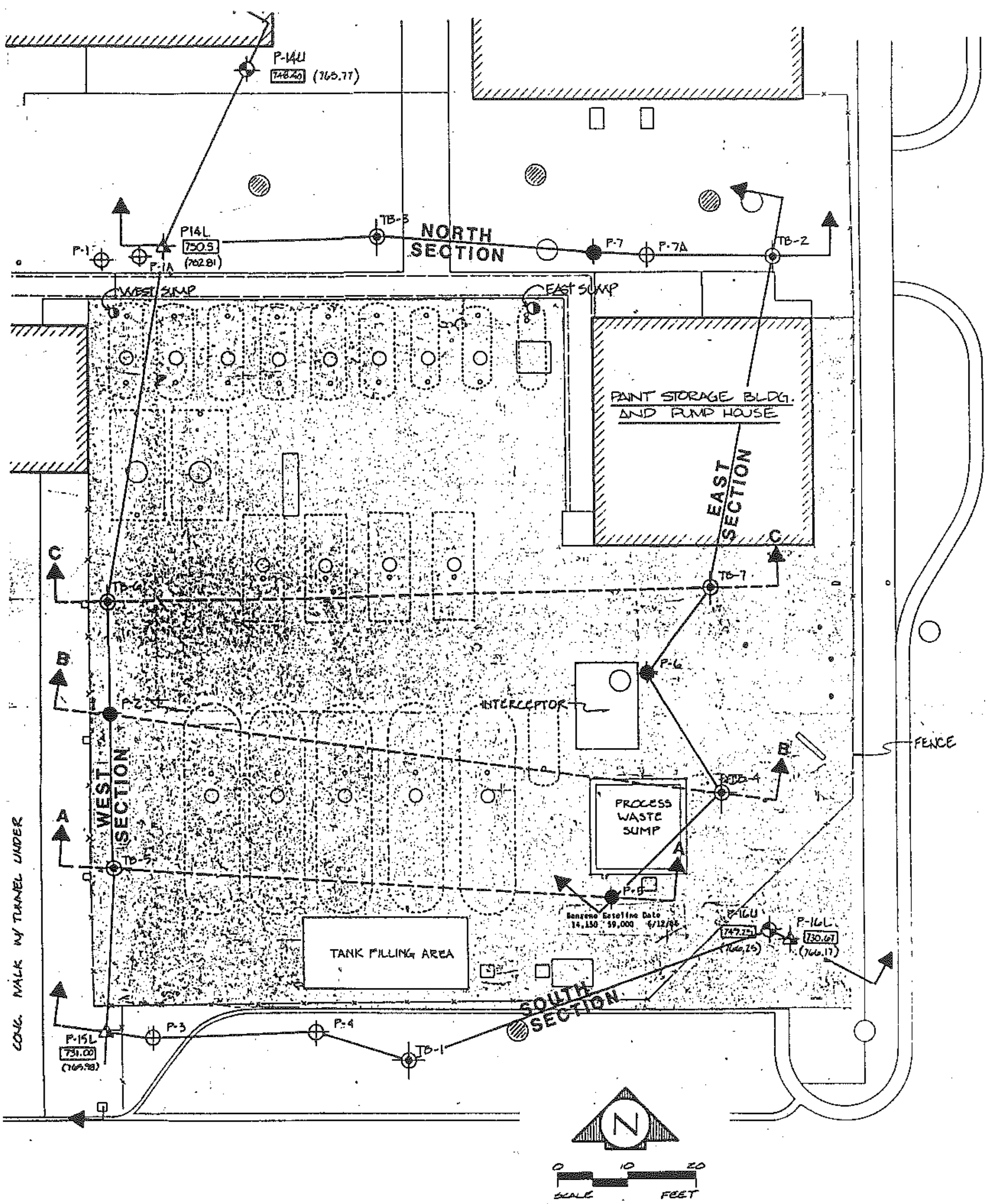


FIGURE 2

TANK FARM DIAGRAM



storage permitting program. The applicants felt that they should designate such storage in case it might be needed in the future. There was fear that not having the designation might somehow interfere with the facility's production. It was intended that any waste fuel generated would be stored in a tank in the tank farm shown in Figures 1 and 2; however, neither in documentation nor in practice was a tank ever designated to contain such waste. This was the result of the fact that no waste fuels were generated from the facility until 1986.

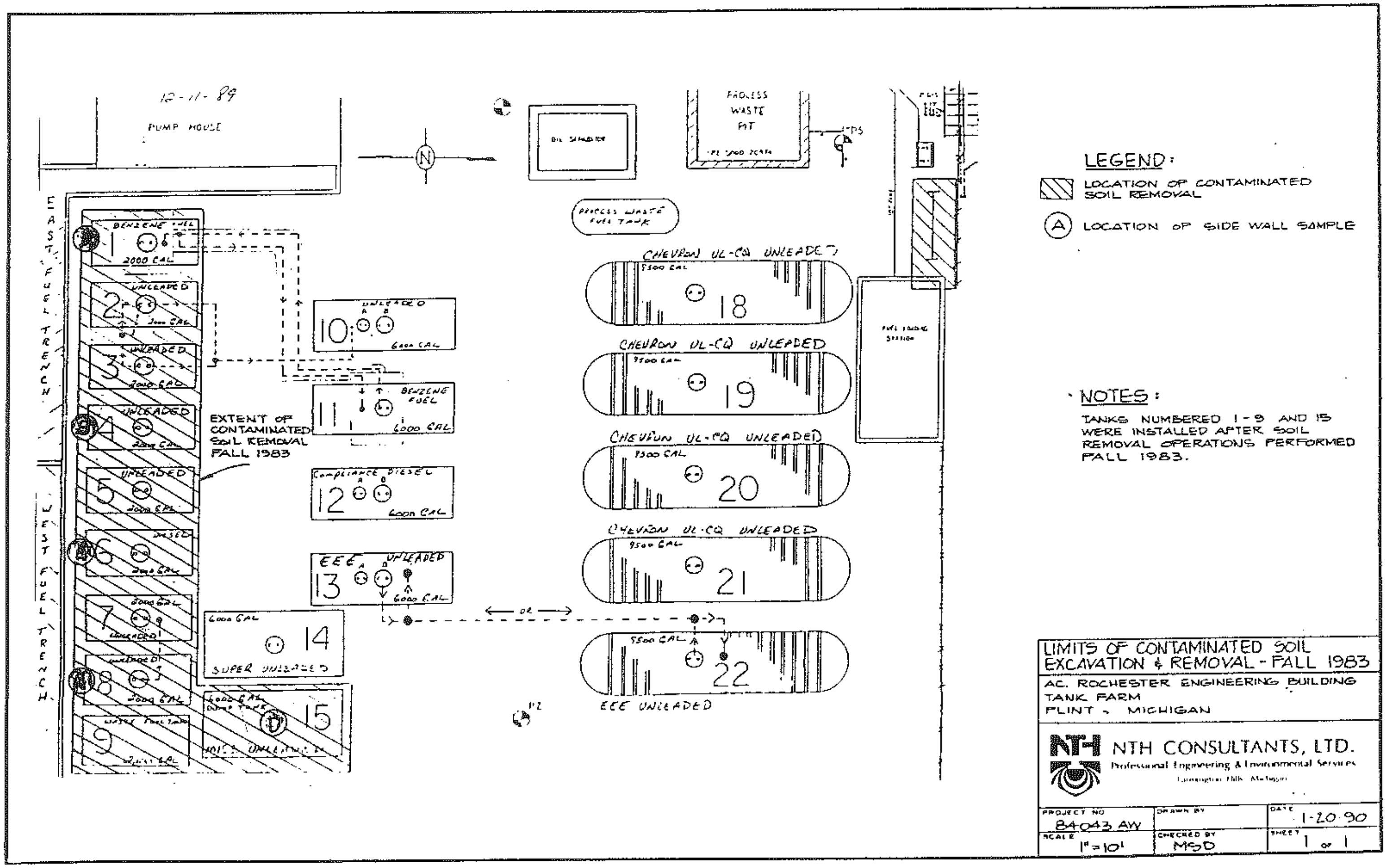
Prior to 1986, commercial gasoline and research fuel blends were used to test automotive components (e.g. fuel pumps) manufactured at the Flint facility. The fuels were drawn from product tanks in the tank farm, distributed to test laboratories and other engineering units, then returned to a product tank in the fuel tank farm. This distribution and tankage was conducted through a closed loop system, and the composition of the test fuels were not altered during the testing process. The fuel, which then was collected in the tank farm after the testing process, was subsequently used for its original purpose, as fuel for plant vehicles. During this period, although the Part A permit application designates tank storage of waste fuel, no waste fuel was being generated, thus no tank storage of hazardous wastes occurred; the inclusion of this storage unit in the original application was an error based on improper understanding of the hazardous waste regulations.

Leakages of benzene and gasoline from separate USTs in the tank farm were discovered in 1983. As a result of that discovery, nine (9) tanks were excavated and removed from the north edge of the tank farm. These tanks are indicated as numbers 1 - 7 and 15 in Figure 3; note that Tank #9 which is currently used for waste gasoline storage did not exist prior to 1983, and was not involved in this removal action. All contaminated soils lying above the uppermost saturated zone (Figure 3), approximately 176 tons, were also excavated and disposed at a licensed landfill. Complete excavation of contaminated soils was prevented by the presence of the remaining tanks in the south portion of the fuel farm and the presence of subsurface foundations and structures surrounding the north end of the tank farm.

The tank farm is currently an active Group 1, Michigan Public Act 307 site as a result of residual contamination from the leaking underground storage tanks. The AC Rochester Division,

FIGURE 3

1983 REMEDIATION DIAGRAM



with the knowledge and oversight of the Michigan Department of Natural Resources, is currently remediating the uppermost contaminated saturated zones. Groundwater is being removed through a down-gradient, subsurface, interception trench and other perimeter purge wells. Purged groundwater is recovered into on-site containers and then discharged to the AC Rochester wastewater treatment facility. This facility can properly treat it prior to ultimate discharge into the City of Flint sanitary sewer system. A summary of the remedial activities is presented in Appendix B. Full reports of the hydrogeology studies and remedial action programs have been previously submitted to the MDNR-WMD in support of the prior closure plan.

After removal of the original nine (9) USTs and the contaminated soils, ten (10) USTs were installed in the north end of the tank farm. The tenth (new) tank is designated #9 (aka. #5009) in Figure 3 and was originally installed as a spare tank. The construction of this tank is described in Section 2.3. The tank was used only intermittently between 1983 and 1986 to store product fuels.

Two other gasoline storage tanks in the tank farm were found to be leaking during leak testing conducted in 1986. These tanks and surrounding soils were excavated and replaced. Between 1983 and the present time, several other spills and leaks of gasoline and other fuels have been recorded in the tank farm. However, any groundwater contamination resulting from these events would be remediated through the existing purge system.

In mid-1986 some of the plant vehicles using the test fuels experienced operating difficulties because of the experimental fuel mixtures that were being used in the test programs. It was decided at that time to begin collecting the test fuels as wastes and to dispose of these materials at a permitted, off-site disposal facility. Since UST #9 (aka. #5009) was available and not often used for product storage, it was designated as the waste fuel tank. Fuels from the test laboratories were collected in the tank via gravity-fed pipes which were located in a concrete-lined pipe trench.

Tank #5009 (Figure 3, #9) was tested and certified for hazardous waste storage by O.H. Materials Corp. in January 1988 as required by 40 CFR 264.191. The results of precision leak tests performed on the tank showed that it was not leaking.

Waste fuel collected in the UST is transported to Petro-Chem Processing for blending into supplementary fuels for energy recovery. The waste gasoline is removed from the tank and disposed at approximately 60-day intervals, but storage has exceeded 90 days on several occasions. Waste fuels have been managed in Tank #9 (aka. #5009) as described herein and in Section 2.3 from mid-1986 to the present time.

2.3 Construction and Operation of UST #5009

Tank #5009 was purchased from Clawson Tank Company and installed in 1983. The tank is constructed of 10-gauge steel and has a 2,000 gallon capacity. Since available leak data at the time of its construction showed that 90% of all leaks in gasoline tanks occurred at or near the bottom of the tank, tank #5009 was fitted with secondary containment (double wall) over the bottom 50% of the tank. Installation of this secondarily-contained tank was performed prior to regulatory requirements for such installations and was done on the basis of best available information at the time. The tank is also fitted with sacrificial magnesium anodes for corrosion protection. A copy of the tank construction drawing is attached in Appendix C.

Waste gasoline is delivered to the tank from component test facilities through a gravity-fed pipe system. The pipe system is secondarily-contained in a subsurface concrete chase (Figure 1) between the test facilities and the UST. The tank is fitted with an American Liquid Control, Series 100 High Level Alarm to prevent overfill of the tank.

The level of waste fuel in the tank is monitored daily, and the inventory level is recorded. When the tank is full, the waste fuel is transported for disposal. The waste gasoline is removed to a tank truck under vacuum through a hose fitting located on the top of the tank. The suction hose is thoroughly drained prior to disconnection from the tank to prevent spills.

2.4 Waste Storage Summary

Information contained in the Engineering Complex's 1985 and 1987 Biennial Reports provides the primary basis for evaluating the types and quantities of wastes managed in the UST. A summary of this data is presented in Table 1.

The data in Table 1 confirms the conclusions presented in the previous subsections that waste fuel was not disposed from or stored in the Engineering Complex fuel farm prior to 1986.

TABLE 1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	YEARLY QUANTITIES (REPORTED IN POUNDS)			
		1985	1986	1987	TOTAL
D001	Waste Gasoline	NA	13,260	40,500	53,760

3.0 TANK CLOSURE

Closure of the Engineering Complex underground hazardous waste storage tank has been specified in a manner that meets the following criteria in 40 CFR 265.111:

- minimizes the need for further maintenance,

- controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere, and

- complies with the applicable closure requirements of 40 CFR Subpart G.

This performance standard will be accomplished by 1) proper management and disposal of the remaining hazardous waste inventory and 2) decontamination of waste handling facilities and equipment.

The strategy for closing the waste gasoline underground storage tank will be to thoroughly clean the tank as described in Section 3.2. After the tank has been thoroughly cleaned, it will be put back into service.

This strategy was selected because the waste gasoline underground storage tank can only be taken out of service for short periods of time in order to continue safe plant operations. This tank was tested and certified for use in January 1988 in accordance with the requirements of 40 CFR 265.191; documentation of this certification is presented in Appendix D.

Soil sampling at the waste gasoline underground storage tank has not been included in this closure plan because the tank is located in a tank farm containing approximately twenty (22) other tanks (see Figures 1 and 2). The proximity of the other tanks, associated piping, buildings and other subsurface structures makes it virtually impossible to safely collect subsurface soils samples. Furthermore, considering the construction and operation of the tank, the short time that it has been in use, and the successful certification of fitness, the probability of contamination from waste management activities in the tank is negligible.

Additionally, the tank farm is an active Group 1, Michigan Public Act 307 Site as a result of contamination from other leaking underground storage tanks that were used to store benzene and gasoline. The known existing contamination from these sources and other recorded spills and leaks of fuel products will interfere with sampling and analysis activities around the waste gasoline storage tank. A groundwater remediation program has been implemented at the site to collect and treat all contaminated groundwater arising from the area of the fuel farm. Soils excavation is not feasible in this area due to the presence of multiple USTs containing flammable liquids and multiple structures whose integrity would be placed at risk by soil removal.

3.1 Waste Management During Closure

Once closure activities have been initiated, all hazardous wastes will be managed in accordance with Michigan Act 64 rules (R 299.9306) requirements for storage of hazardous wastes for less than 90 days by generators of more than 1000 kg of hazardous wastes per month. All wastes in storage at the time of closure will be transferred to disposal or temporary storage. Materials transferred to temporary storage will be transported for disposal within 90 days of their respective accumulation start dates.

In order to continue safe operations at the Engineering Complex, the hazardous waste fuel storage tank can only be taken out of service for a short period of time; therefore, the storage tank will be taken out of service for only the time required for inspection and cleaning. Since the tank has been assessed and certified for use in accordance with 40 CFR 265.191, it will be returned to service immediately after decontamination. During the period of time the tank is out of service, wastes generated will be accumulated in containers and managed at a temporary container accumulation area in full compliance with the 90-day accumulation area requirements for generators. Future waste management activities in the UST will be conducted according to the requirements (40 CFR 262.34) for generators of more than 1000 kg of hazardous wastes per month.

3.2 UST Decontamination

In order to continue safe plant operations, the waste gasoline underground storage tank will only temporarily be taken out of service during closure. All liquids in the waste gasoline underground storage tank will be pumped into a tank truck for transportation to disposal, and all sludges will be removed to disposal. The underground storage tank will then be thoroughly cleaned with a water/alkaline, non-phosphate detergent (All-Chem #502-GX or similar) solution using a high pressure spin blaster. After cleaning, all of the areas will be triple rinsed with water. All cleaning and rinsing solutions will be retained and managed as described in Section 3.3.

3.3 Management of Decontamination Rinsates

All waste aqueous and solvent liquids from decontamination of the UST will initially be collected in drums, vacuum tanker, holding tanks or other appropriate containers on-site. These materials will then be chemically analyzed to determine if they are compatible with the plant's wastewater treatment facility. If compatible, they will be sent to the AC Rochester wastewater treatment facility for proper treatment prior to ultimate discharge into the City of Flint sanitary sewer system. If incompatible, they will be properly managed and disposed in accordance with applicable state and federal regulations.

The AC Rochester wastewater treatment facility is permitted to discharge under the Metal Finishing, Porcelain Enameling, Electrical and Electronic Components, and Plastic Molding Pretreatment Standards. The determination of applicability for wastewater treatment of closure waste liquids will be based on the wastewater discharge limits currently in effect for the facility. The maximum adjusted discharge limits currently in effect for the plant are listed in Table 2.

Based on wastewater treatment efficiencies and dilution factors at the AC Rochester wastewater treatment facility, the acceptance criteria for closure liquids will be as shown in Table 2. These criteria result from the treatment plant's ability to chemically and physically remove the contaminants of concern in one or more of the plant's following processes: acid/base neutralization, metals precipitation, air oxidation, meta-bisulfite reduction, and hypochlorite oxidation.

Analyses of the closure liquid samples for total toxic organics and lead will be performed using the analysis methods specified in Table 3. If concentrations of <u>all</u> analytes are below the treatment plant acceptance criteria shown in Table 2, the closure liquids will be sent to the AC Rochester wastewater treatment facility for processing.

If any of the acceptance criteria are exceeded, the wastes will be transported and disposed at a licensed wastewater disposal facility. If EP Toxicity analysis data (EP Toxicity Characterization, USEPA Method 1310, SW-846) results in characterization as hazardous waste, the wash waters will be managed according to Michigan Act 64 rules; otherwise, they will be managed in accordance with Michigan Act 136 rules.

TABLE 2

AC ROCHESTER DIVISION, WASTEWATER TREATMENT FACILITY ACCEPTANCE CRITERIA AND EFFLUENT DISCHARGE LIMITS

ANALYTE	ACCEPTANCE CRITERIA	EFFLUENT DISCHARGE LIMIT
Lead	63.0 mg/l	0.63 mg/l
Total Toxic Organics	19.5 mg/l	1.95 mg/l

TABLE 3

SUMMARY OF WASTEWATER ANALYTES, ANALYSIS METHODS AND METHOD DETECTION LIMITS

Analyte	SW-846 Method	Wastewater Method Detection Limit (mg/l)
Total Toxic Organics		
Volatiles	8240	0.01 ea
Base-Neutral Extractables	8250/8270	0.01 ea
Acid Extractables	8250/8270	0.05 ea
Pesticides/PCBs	8080	0.001 ea
Michigan Act 64 Toxic Metal		
Lead	7420	0.05

4.0 CLOSURE REPORT AND CERTIFICATION

At the conclusion of the clean closure program a report of activities and results, including owner and registered engineer certifications, will be prepared and submitted to the Michigan Department of Natural Resources (MDNR) within sixty (60) days after completion of closure activities. This report will contain the following applicable items:

- Certification statements by owner and registered professional engineer;
- Site assessment sampling and analysis procedures and results;
- Sampling location diagram;
- Technical and statistical evaluations of analysis data;
- Summary of closure activities including:
  - site and equipment decontamination,
  - location of disposal site(s),
  - site management activities,
  - field observations,
  - actual schedule;
- Copies of all waste shipment manifests;
- "Clean check" sampling and analysis procedures and results;
- Summary of site restoration activities and land use projections;
- Copies of approved closure plan and closure plan approval letter.

Closure activities will be monitored, inspected, and certified by an independent, registered professional engineer. Closure certification statements provided by the owner/operator and the independent registered engineer will be supplemented by the certification language provided in 40 CFR 270.11(d).

5.0 CLOSURE SCHEDULE AND COST ESTIMATE

5.1 Closure Schedule

The following estimated schedule has been developed for the closure of the Engineering Complex of the AC Rochester Division of General Motors Corporation underground hazardous waste storage tank:

ACTIVITY	DURATION
TANK CLOSURE	
Site Preparation and Mobilization	2-3 weeks
Tank Decontamination	1-2 weeks
Chemical Analyses of Waste Waters	1-2 weeks
Waste Disposal	1-2 weeks
DATA EVALUATION/REPORTING	3-4 weeks

This schedule is highly susceptible to unforseen technical and site difficulties as well as effects of weather on projected activities.

The closure program will commence according to the above schedule immediately after receipt of the closure plan approval. The Waste Management division, Lansing District staff (517/322-1300) and Lansing Permits Section staff (517/373-2730) will be notified at least six (6) calendar days prior to the initiation of any site activities.

5.2 Cost Estimate

The following cost estimates have been prepared for the various anticipated and contingent closure activities:

Tank decontamination	$5,000.00
Chemical analyses	$3,000.00
Reporting and Certification	$ 8,000.00
TOTAL ESTIMATED COST:	**$16,000.00**

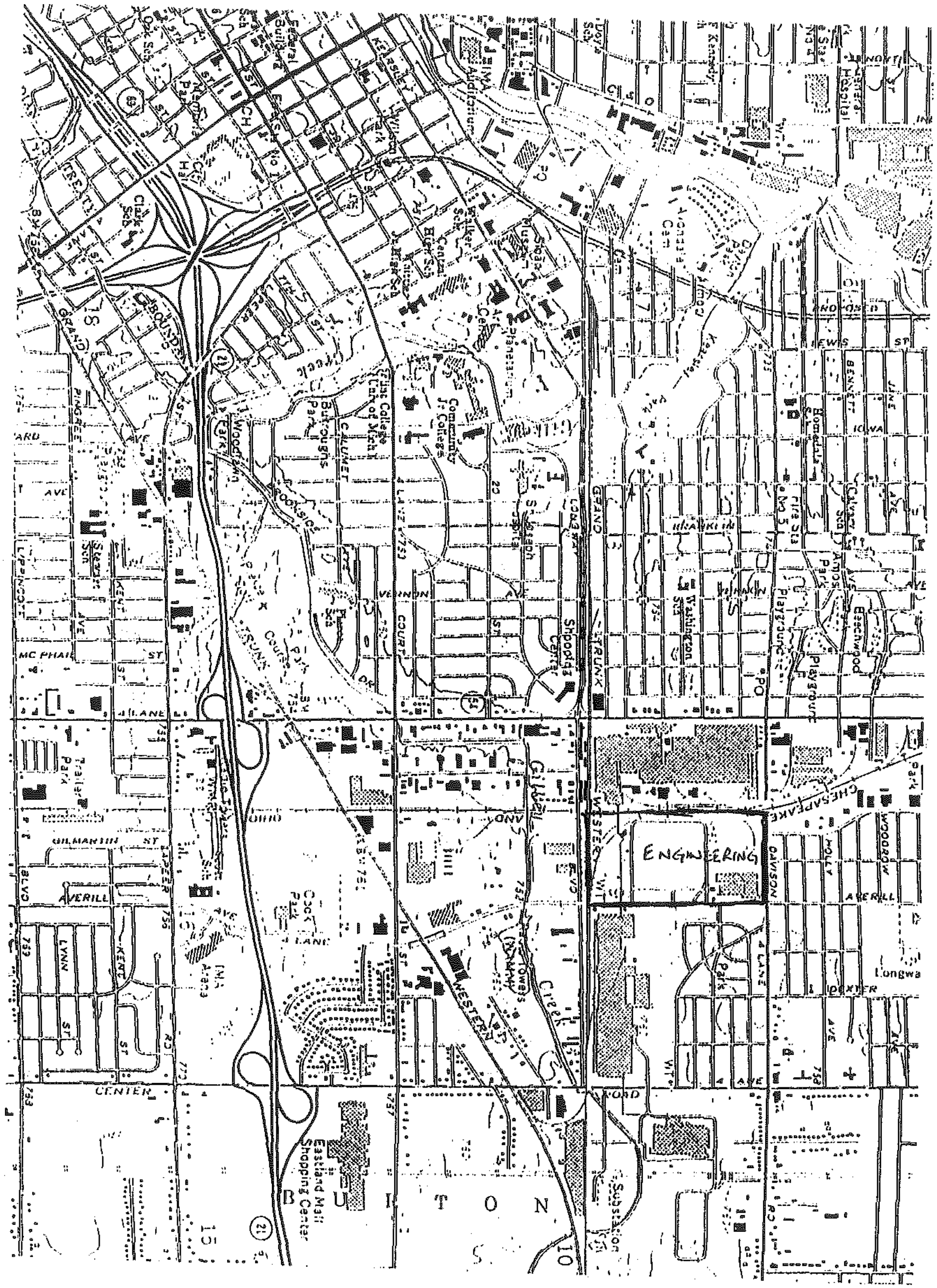
6.0 FINANCIAL ASSURANCE AND LIABILITY INSURANCE

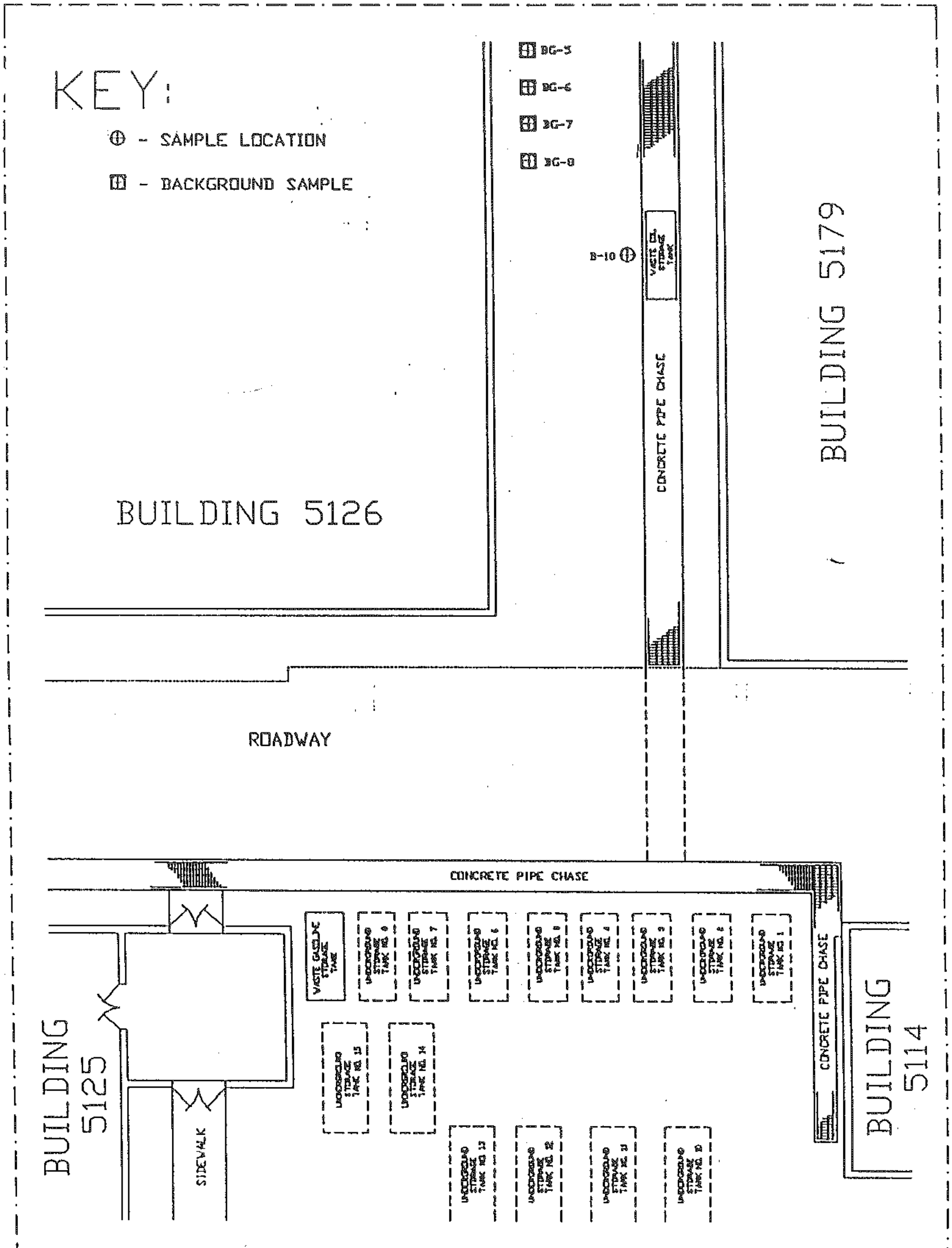
General Motors Corporation guarantees the costs of closure for the interim status facility described in this closure plan in accordance with the requirements of 40 CFR 264 & 265, Subpart H and Michigan Public Act 64. A copy of the data submitted to the Michigan Department of Natural Resources in support of the use of the financial test to demonstrate financial responsibility is attached in Appendix E.

APPENDIX A

LOCATION AND SITE PLANS

LOCATION & SITE PLAN





TECHNA CORPORATION	WASTE OIL STORAGE TANK SAMPLING POINTS	SCALE: 1"= 20'-0"	FIGURE 6
JOB NO. 207-8001	AC ROCHESTER DIVISION GENERAL MOTORS CORP ENGINEERING COMPLEX MID980568620	N	
DATE: OCT. 14, 1988 REV. Ø	1601 N. AVERILL AVE. FLINT MI 48556		

APPENDIX B

SUMMARY OF 1983 UST REMOVAL AND REMEDIATION

NTH Consultants, Ltd.
A Neyer, Tiseo & Hindo Company
38955 Hills Tech Drive, Farmington Hills, Michigan 48331-3432 • (313) 553-6300 • Fax (313) 489-0727

January 22, 1990
Project No. 84043 AW

Mr. C. R. Wendel
AC Rochester Division
General Motors Corporation
1300 North Dort Highway
Flint, Michigan 48556

RE: Review of Remediation Efforts-Engineering Building Tank Farm, AC Rochester Manufacturing Facility, Flint, MI

Dear Mr. Wendel:

As you requested, we have prepared a review of the remediation effort at the engineering building tank farm. As you know, both benzene and gasoline-related contaminants were discovered in the soil and groundwater at the tank farm in late Summer, 1983. The remediation program has been underway since the discovery and has included source removal (repair or replacement of leaking tanks and the removal of contaminanted soil) and remediation of contaminated groundwater in the upper saturated unit and the lower aquifer. The purpose of this letter is to review the documentation which describes the source removal operation that took place in late 1983 and early 1984 as part of the remediation effort at the engineering building tank farm.

Based on information on file at AC Rochester, in late 1983 removal of contaminant sources was effected by the removal of nine 2,000 gallon underground storage tanks and the removal and disposal of approximately 176 tons of soil from this area. As shown on Figure 1, the L-shaped excavated area included all of the tanks in the first row along the northern edge of the tank farm. Horizontally, the excavation was extended to the western, eastern and northern limits of the tank farm. The excavation was extended to the south as shown on Figure 1. In the vertical direction, the excavation extended to a depth of approximately 11 feet. The depth to groundwater in that area was approximately 12 feet, based on water level measurements in nearby observation wells that had been installed in 1983. Therefore, it appears that the excavation was extended to its practical limit both horizontally and vertically.

The sources of contamination which were removed at that time included the contaminated soil, a gasoline tank and the benzene tank; both tanks had been found to be leaking. After testing the excavated soil, which had been stockpiled, the soil was transported to the Fondessy Landfill in Ohio for disposal on four different dates between November 3, and December 23, 1983. The waste handling was documented by waste disposal manifests which are on file at AC Rochester. These manifests indicate that approximately 176 tons of contaminated soil was transported to Fondessy in eight shipments.

After completing the excavation, AC Rochester personnel collected soil samples from the sidewalls of the excavation. The results of chemical tests on these samples are tabulated on Table A and presented on Figure 2. Sets of soil samples were collected at five locations along the northern edge of the excavation at locations designated as A, B, C and E; the sample set designated as "D" was collected from the southwestern section of the excavation, in the area currently occupied by Tank No. 15 (refer to Figure 1). At each of these locations, soil samples were obtained at approximately one foot intervals for a distance of five feet into the sidewall. Individual "grab" samples were also collected at the eastern and western end of the excavation. The samples were generally tested for the presence of benzene, gasoline (by chromatograph comparison using unleaded gasoline as a GC standard) and lead.

The results of tests on these samples showed that the concentration of benzene in the soil generally decreased at distances greater than three feet into the northern sidewall of the excavation. In two cases, the concentration decreased by more than a factor of ten. Further, the results of tests on samples from location C clearly show that contaminants were present below the area now occupied by the waste fuel tank after the excavation was complete and prior to the installation of the waste fuel tank.

Because the excavation had been extended to its practical limit and because groundwater contamination had been discovered, (including two wells installed in the northwest corner in late 1983 by Michigan Drilling Company), groundwater remediation methods were to be considered in subsequent hydrogeologic investigations. As an interim measure, AC Spark Plug personnel installed a perforated drain pipe along the western half of the northern edge of the tank farm and connected it to a sump located in the northwest corner of the tank farm (now referred to as the west sump).

AC Spark Plug installed nine new, double wall tanks, including the existing waste fuel tank, in the excavation after the completion of this source removal operation. The waste fuel tank is identified as Tank No. 9 on Figure 1. The remaining tanks in the tank farm, (in the second and third rows) were leak tested by a subcontractor to AC Spark Plug.

Lastly, a probable contaminant source removal was also effected by the removal of a tank in the southeast section of the tank farm. The process waste pit and the oil separator were constructed in the southeast section of the tank farm in 1974. Prior to their construction, a tank was removed from this area; the concrete pad beneath the tank was encountered during the drilling of Well No. P-5 in 1983 by Michigan Drilling Co. Based on the absence of other sources and on the groundwater flow direction in the upper unit, it appears probable that this tank was the source of the gasoline related soil and groundwater contamination noted in this area. Groundwater remediation has been underway in this area since April, 1988.

In summary, two conclusions can be developed from the review of the remediation program as presented above. First, source removal has been considered and implemented as part of the overall remediation program at the engineering building tank farm. Second, both soil and groundwater contamination were encountered in the area currently occupied by the waste fuel tank prior to its installation. As such, it would not be possible to separate any recent hydrocarbon release from this tank from the contaminants which were already present (and under a remediation program) in the area. However, based on the age and construction of the tank (double walled), it is unlikely that the waste fuel tank has contributed to the situation.

I hope that this brief review of the available information is sufficient to meet your needs at this time. If you have any questions or require additional information, please do not hesitate to contact me.

Very Truly Yours

NTH Consultants, Ltd

Robert F Gorman

Robert F. Gorman
Project Director

TABLE A
BENZENE, GASOLINE AND LEAD CONCENTRATIONS FROM
SIDEWALL SAMPLES A THROUGH E
A.C. ROCHESTER ENGINEERING BUILDING
TANK FARM, FALL 1983

Sample	Date	Benzene (mg/kg)	Gasoline (mg/kg)	Lead (mg/kg)
A @ 12"	10-05-83	50	70	1.8
A @ 24"	10-05-83	3	<10	1.1
A @ 36"	10-05-83	10	<10	1.0
B @ 12"	10-05-83	530	260	12
B @ 24"	10-05-83	1800	2200	9.0
B @ 36"	10-05-83	9300	1300	10
B @ 48"	10-14-83	64	<10	1.5
B @ 60"	10-14-83	40	<10	1.5
C @ 12"	10-05-83	1000	4500	2.9
C @ 24"	10-05-83	900	860	11
C @ 36"	10-05-83	1400	1200	4.0
C @ 48"	10-14-85	100	160	2.9
C @ 60"	10-14-85	170	220	3.6
D @ 12"	10-11-83	<1	<5	4.4
D @ 24"	10-11-83	5	<5	5.3
D @ 36"	10-11-83	6	<5	3.6
E @ 48"	10-14-83	12	<10	<0.8
E @ 60"	10-14-83	17	<10	4.9

Figure 2

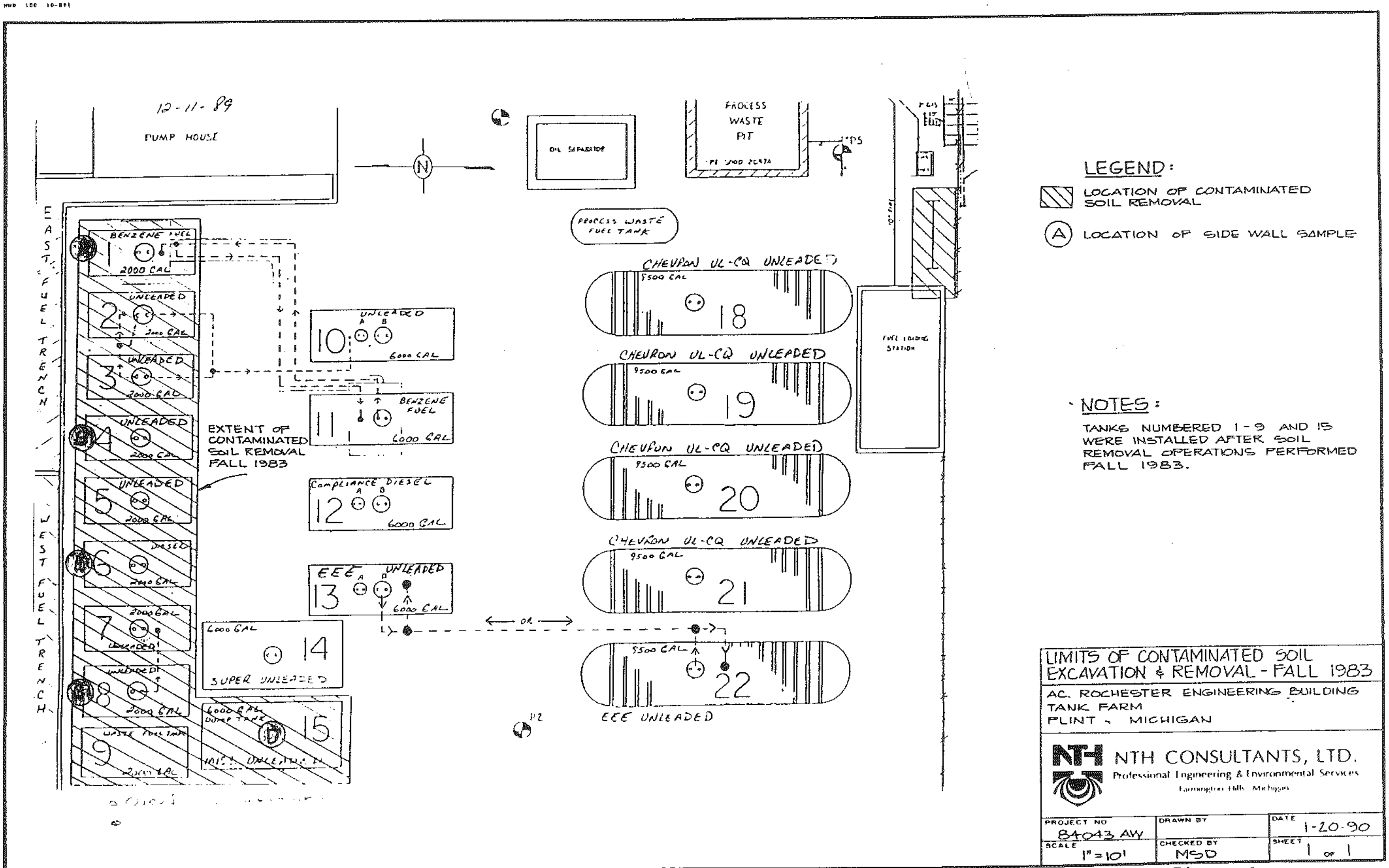

12-11-89
PUMP HOUSE
OIL SEPARATOR
PROCESS WASTE PIT
PROCESS WASTE FUEL TANK
EAST FUEL TRENCH
WEST FUEL TRENCH
BENZENE FUEL 2000 GAL
UNLEADED 2000 GAL
DIESEL 2000 GAL
WASTE FUEL TANK 2000 GAL
UNLEADED 6000 GAL
BENZENE FUEL 6000 GAL
COMPLIANCE DIESEL 6000 GAL
EEE UNLEADED 6000 GAL
6000 GAL SUPER UNLEADED
6000 GAL DUMP TANK
EXTENT OF CONTAMINATED SOIL REMOVAL FALL 1983
CHEVRON UL-CQ UNLEADED 9500 GAL
EEE UNLEADED
OR
FUEL LOADING STATION
LEGEND:
LOCATION OF CONTAMINATED SOIL REMOVAL
LOCATION OF SIDE WALL SAMPLE
NOTES:
TANKS NUMBERED 1-9 AND 15 WERE INSTALLED AFTER SOIL REMOVAL OPERATIONS PERFORMED FALL 1983.
LIMITS OF CONTAMINATED SOIL EXCAVATION & REMOVAL - FALL 1983
AC. ROCHESTER ENGINEERING BUILDING TANK FARM FLINT, MICHIGAN
NTH CONSULTANTS, LTD.
Professional Engineering & Environmental Services
Farmington Hills, Michigan
PROJECT NO 84043 AW
SCALE 1"=10'
DRAWN BY
CHECKED BY MSD
DATE 1-20-90
SHEET 1 OF 1

Figure 1

APPENDIX C

UST #5009 CONSTRUCTION DRAWING

APPENDIX D

HAZARDOUS WASTE STORAGE TANK CERTIFICATION REPORT

REC'D
JUL 17 89
REC'D

FINAL REPORT FOR
TANK TESTING AND TANK SYSTEM
INTEGRITY ASSESSMENTS FOR AC SPARK PLUG
DIVISION'S FACILITY IN FLINT, MICHIGAN

Submitted to:

General Motors Corporation
AC Spark Plug Division
Flint, Michigan

O.H. Materials Corp.

Robert J. Bourne

Robert J. Bourne
Project Manager, Midwest Region

January 25, 1988
Project 5626

FINAL REPORT FOR
TANK TESTING AND TANK SYSTEM
INTEGRITY ASSESSMENTS FOR AC SPARK PLUG
DIVISION'S FACILITY IN FLINT, MICHIGAN

Submitted to:

General Motors Corporation
AC Spark Plug Division
Flint, Michigan

This report has been reviewed and approved for conformity with acceptable engineering practices and federal regulations.

Feb 24, 1988
Date

Project 5626

R. Daniel R. Looper
General Manager, Engineering and Science
Ohio Engineer No. 51110

TABLE OF CONTENTS

1.0 INTRODUCTION

In November 1987, General Motor's AC Spark Plug Division (AC) of Flint, Michigan, selected O.H. Materials Corp. (OHM) to perform an extensive tank system integrity assessment for 11 tanks and integrity assessments on 22 additional tanks. This project was awarded in response to AC's RFQ No. 9225 and OHM's subsequent Proposal No. 87.01289 dated November 23, 1987. The project scope of work included testing tanks and lines and preparing a final report. This report is a portion of the final report and covers five tanks designated by AC as containing hazardous wastes and not having any secondary containment.

The project was initiated by AC as part of their overall environmental maintenance program and to be in compliance with new federal regulations. As stated in 40 CFR Section 264, "owners or operators of existing tank systems which do not have secondary containment meeting specific requirements must keep on file written assessments of the tank system's integrity, namely that the tanks are fit for use." Certified by an independent, registered professional engineer, the assessments must be completed and on file by January 12, 1988.

Due to the limited amount of time OHM had to complete the assessment and have it on file to AC by January 12, 1988, the assessment report was handled in two phases. The first phase involved preparing a rough draft reviewed and certified by an OHM registered professional engineer. The rough draft was completed and on file at AC by January 12, 1988. The second phase, preparation of a final report, is incorporated herein. This report takes into account corrections made by AC on their tank systems following our tank assessment. These corrections allowed some of the tank systems to be considered structurally sound and fit for use. The revised final report has also been reviewed and certified by OHM's registered professional engineer.

1.1 CONTENT

This report contains information on the five tanks which contain hazardous wastes, as determined by AC. Each assessment of the tank's structural integrity and acceptability is based on information in 40 CFR Section 264.191 and includes the following:

- o Written, certified assessment that attests to the tank system's integrity.

- o Determination of adequate design, sufficient structural strength, and compatibility of construction material with the waste(s) to be stored or treated, based on the leak test and construction design standards. In addition, the hazardous characteristics of the wastes, tank age, and corrosion protection measures are considered.

- As required in the Environmental Protection Agency's (EPA) regulation, the assessment was reviewed and certified by an independent, registered professional engineer. During the engineer's review of the assessment, equal consideration was given to the available facts provided by AC and the visual/physical review by the on-site assessment crew. This certification becomes invalid if any changes are made to the tank or the ancillary equipment.

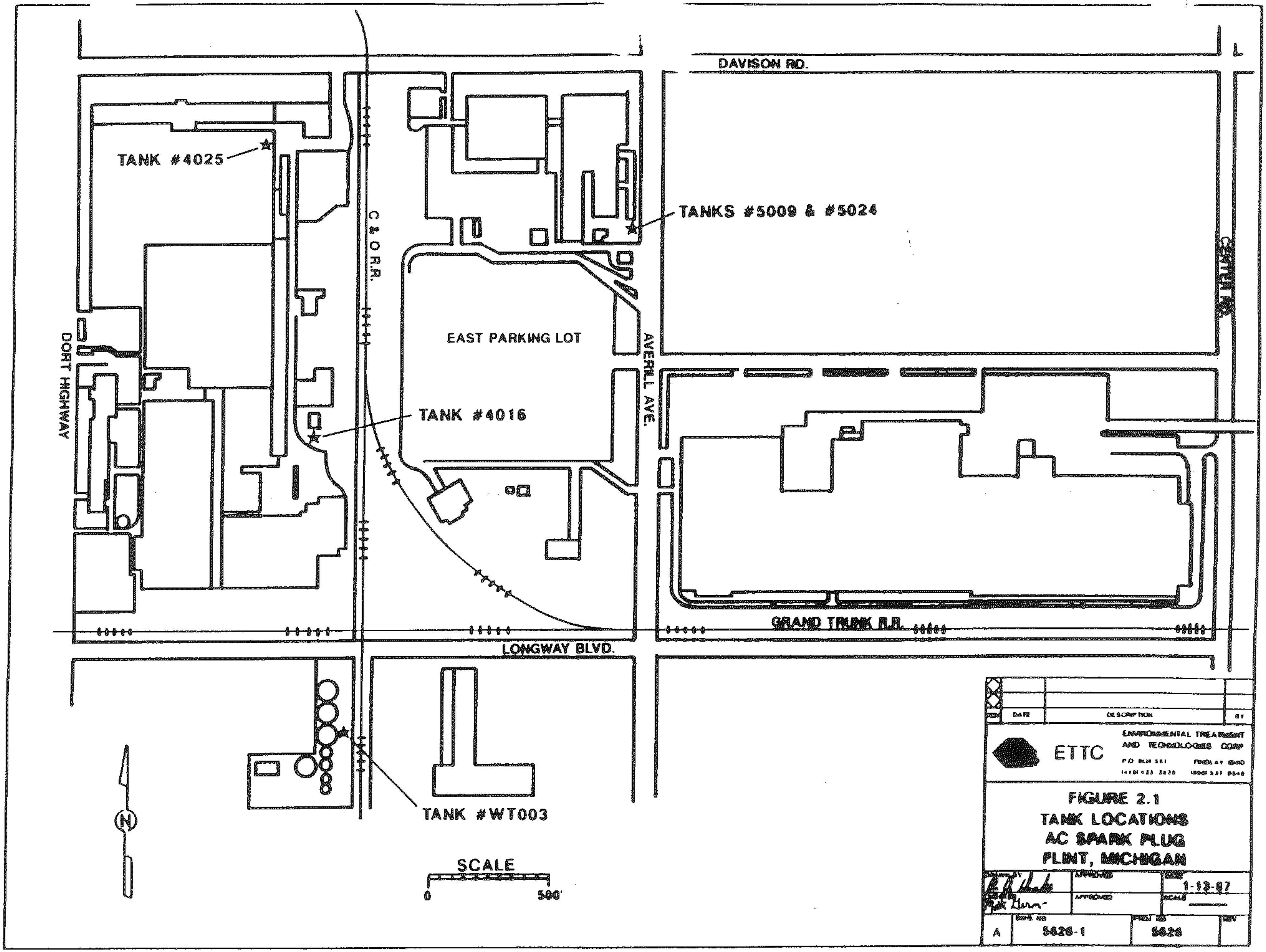
This report describes the following five tanks:

AC Tank Number	Tank Contents
WT 003	Waste Oil
4016	Waste Oil
4025	Waste Stoddard Solvent
5009	Scrap Fuel
5024	Waste Oil

2.0 SITE BACKGROUND

The AC facility manufactures spark plugs and air and fuel filters, and is located in the southeast area of Flint, Michigan, in Genessee County, Michigan. The site topography is generally flat and consists of glacial till deposits of sand and gravel, with some clay lenses.

The locations of the tanks described herein are shown on Figure 2.1.


DAVISON RD.
CENTER RD.
TANK #4025
TANKS #5009 & #5024
C & O R.R.
EAST PARKING LOT
AVERILL AVE.
DORT HIGHWAY
TANK #4016
GRAND TRUNK R.R.
LONGWAY BLVD.
TANK #WT003
N
SCALE
0
500'
DATE
DESCRIPTION
BY
ETTC
ENVIRONMENTAL TREATMENT AND TECHNOLOGIES CORP
FIGURE 2.1
TANK LOCATIONS
AC SPARK PLUG
FLINT, MICHIGAN
APPROVED
1-13-87
SCALE
A
5626-1
5626

N05661

3.0 PETRO-TITE TEST

AC's tanks were precision tested using the Petro-Tite test method (formerly known as the Kent-Moore test method). The Petro-Tite test is the most widely accepted tank-testing procedure. The test takes into consideration all variables during a precision test, including temperature, product circulation, ground-water counter pressure, tank-end deflection, and removal of trapped air pockets.

3.1 TEST PROCEDURES

The test measures the change in volume at a uniform hydrostatic pressure over equal time periods. Volume changes attributed to pressure or temperature changes within the tank system are measured and corrected so that a net volume change over time is recorded. A summary of the Petro-Tite test procedure follows:

1. Depth to ground water in tank backfill is measured. Counter pressure affects exerted onto the tank from a high water table are compensated for by raising the level of the tank-tester standpipe. This ensures that tank ends will be allowed to fully deflect.

2. All tank and line appurtenances are capped and sealed for the test. Air bleeder valves are installed wherever air could be trapped in the system.

3. The Petro-Tite test apparatus is assembled and water is added until the tank is completely full and the desired level of fuel in the tester standpipe is reached.

4. Product is circulated within the tank system to remove temperature layering. Circulation within the tank system and test equipment mixes the product so one average temperature can be measured with the thermal sensor.

   The high liquid level in the standpipe is maintained during circulation to ensure that maximum tank-end deflection occurs. Because the tanks change shape and volume under the hydrostatic head pressure during the test, these volume changes must be measured throughout the test.

5. A representative sample of water is removed from the system and the thermal coefficient of expansion is measured and recorded.

6. Test measurement begins when tank ends have fully deflected and hydraulic head can be reduced. Both product temperature and product volume changes are recorded at 15-minute intervals.

7. Volume changes caused by temperature effects are corrected by using the product coefficient of thermal expansion. Gross volume changes are adjusted to actual net volume change by subtracting expansion or contraction caused by temperature change.

8. A value for actual net volume change over 1 hour is obtained for the tank system. It is widely accepted by most authorities, including the NFPA, that a tank is "tight" if the measured net change in volume is less than 0.050 gallons per hour (gph). The 0.050-gph value should be considered a precision tolerance; it is not meant to indicate the permission of any leak.

4.0 TANK ASSESSMENTS

The following information discusses the five tank assessments. Each section begins with an overview of the tank system, including the process flow and visual observations made by the field assessment crew. This overview is followed by facts obtained from AC on each of the tank systems, including facts on the design standards used during construction, hazardous characteristics of the tank's contents, existing corrosion measures, documented age, and results of the leak test(s). Our opinions on the structural integrity of the tank systems and their condition for continued use is also detailed.

A summary of the tank assessments is included below:

Tank Number	Assessment	Primary Reason(s)
WT 003	Fit for use	
4016	Unfit for use	Tank condition not suitable for storing hazardous wastes
4025	Fit for use	
5009	Fit for use	
5024	Fit for use	

4.1 TANK WT 003

This tank system is used to store waste oil at AC's wastewater-treatment facility. The facility contains both a 320,000 gallon clarifier and 600,000 gallon cyclator used for wastewater clarification. These units have rotating oil skimmers which remove oil from the water's surface.

The oil gravity feeds from each skimmer into a single 6-inch mild steel drain line. A 6-inch drain pipe extends from the top of both the clarifier and cyclator and runs down the outside of each holding tank before entering the ground. The pipes then join together and enter Tank WT 003 as one line approximately 40 feet away. This 6-inch pipe is noted as the drain pipe.

4.1.1 Tank Description

After the oil separates in Tank WT 003, the water is returned to the clarifier through a 2-inch mild steel pipe which extends from the tank bottom through the middle of the tank and continues underground to the pumping station located approximately 20 feet away. The pumping station is located directly beside the clarifier. Water from the 2-inch return pipe is pumped from the station, over the top, and into the clarifier.

Two other pipes from the tank are the vent pipe and the waste oil removal lines. The vent pipe runs underground about 15 feet away from the tank where it rises above grade approximately 15 feet. The oil removal line rises directly off the tank to grade. A 3-inch steel pipe with a male OPW fitting lies at grade inside an 8-inch steel riser pipe. AC contracts a local company to periodically remove the waste oil.

A concrete observation pit, measuring approximately 5 feet by 6 feet from tank top to grade, allowed the field assessment crew to visually inspect the tank top. A 1 1/2-inch-diameter steel pipe was threaded into the tank top using pipe thread sealant. Extending to grade level, the top of the pipe is capped with a 1 1/2-inch male OPW and a 1 1/2-inch OPW cap. This pipe is used as a stick port in order to check the levels of the tank's contents. The OPW cap is removed and the measuring stick is lowered into the stick port pipe to obtain an indication of the level of the tank contents. The OPW cap is then placed back onto the male OPW for the proper seal.

The tank is thought to have a 5,000-gallon capacity (no records are available) with dimensions of 96 inches in diameter and 13 feet, 6 inches in length. The tank is constructed of mild steel which is compatible with the tank contents. The tank burial depth is 64 inches below grade, with top soil and the observation pit as the overburden. The tank dimensions are an estimate obtained by the OHM Petro-Tite tank testing crew using common tank charts.

4.1.2 Construction

There are no records available of the tank manufacturer, so national design standards cannot be referenced for structural integrity assessment of the tank. Blueprints to show the dimensions, wall thickness, or openings on this tank to assess the structural integrity of the tank are also unavailable.

The installation records for the ancillary equipment on the tank system could not be located; therefore, we are unable to determine whether national design standards were followed. Blueprints on the ancillary equipment are also unavailable, so the pipe gage is unknown. Based on field observations, the ancillary pipes are constructed of mild steel which is compatible with the tank contents.

4.1.3 Contents

Hazardous characteristics of the tank contents are listed in the analytical report prepared by Clow Hydro Research Services in January 1985, and found in Appendix A. The contents are compatible with mild steel.

4.1.4 Assessment Results

The following results are reported:

- Corrosion protection: none
- Volumetric leak test on tank including vent line and 6-inch drain line (performed August 18, 1986, by OHM; see Appendix C): -0.041 gph (certifiable at time of test) *Refer to 5,000-gallon Wastewater Treatment Tank
- Return line (2 inch) volumetric leak test: -.00005 gph. (certifiable at time of test)
- Tank age: estimated to be 32 years. This estimate is based on the age of the facility where the tank is located.

The aboveground ancillary equipment pipes are inspected daily by AC employees.

Upon review of the test results and field crew inspection, OHM judges Tank WT 003 as fit for use. The following reason is cited:

- The tank test is within the hourly leak rate accepted by the EPA

4.2 TANK 4016

This tank is used for dumping waste oil from the general area of Complex 4.

4.2.1 Description

There are two open areas on top of Tank 4016. One opening is approximately 12 inches in diameter. A large sheet-metal funnel rests in this opening for the hand-dumping of waste oil. The funnel extends approximately 12 inches below grade where it enters a riser pipe coming off the tank top. The riser pipe extends approximately 24 inches above the tank top, but 12 inches below the concrete containment overburden.

A second opening, approximately 6 inches in diameter, has a riser pipe off of the tank top to grade. The tank does not have a vent pipe.

A 2-inch pipe originating at the tank bottom passes through the 6-inch opening over to a self-priming centrifugal pump. This aboveground pump removes the water phase from below the oil in the tank and discharges it into a nearby process sewer which leads to AC's wastewater-treatment plant. A second pipe which ends inside the 6-inch opening is connected to a Sandpiper diaphragm pump. This pump is part of a system set up by AC which vacuums the oil out of waste oil drums and discharges it into the tank.

The discharge line on the Sandpiper pump has another 2-inch line branching off of it. This line runs up a support beam and across the ceiling for approximately 300 feet. The 2-inch line enters a paint room where it descends the wall to approximately 4 feet off the floor. This line now has a permanent cap over it, but is used to remove waste oil in the winter months from drums in the paint room.

The tank is located in a drum staging area with a roof over the entire area. The tank is buried 36 inches below grade with concrete overburden. The tank is thought to be 96 inches in diameter and 27 feet in length. These dimensions are an estimate obtained by the OHM Petro-Tite tank testing crew using common charts.

4.2.2 Construction

There are no records of the tank manufacturer, so national design standards cannot be referred to for structural integrity of the tank. Blueprints showing the materials of construction, dimensions, wall thickness, or openings on this tank are also not available to assess the structural integrity of the tank.

There are no records of who installed the ancillary equipment on the tank system; therefore, we cannot determine whether national design standards were followed. The ancillary equipment is constructed of mild steel. All known plumbing for Tank 4016 is above ground.

4.2.3 Contents

The waste oil characteristics were listed in a laboratory report by the Analytical Laboratories Division of Burnah Technical Services, Inc. in Pontiac, Michigan, dated June 8, 1987. A copy of the report is included in Appendix A.

4.2.4 Assessment Results

The following test results are reported:

- o Corrosion protection: none
- o Age: unknown, but estimated to be 10 years based on the age of the drum pad where the tank is located
- o Volumetric leak test on tank (performed August 13, 1986, by OHM; see Appendix C): -0.032 gph (certifiable at the time of the test)
- o No volumetric tests on the ancillary pipes

Since all known plumbing is above ground, it is inspected daily by AC employees.

Tank 4016 is judged unsuitable for use.

4.3 TANK 4025

This system is used to collect waste solvent used for cleaning miscellaneous parts and tools in Complex 4, Building 4100.

4.3.1 Description

There are two dump stations located inside Building 4100. The two stations are metal-fabricated pits approximately 2-inches deep with steel grates covering them. Each station has a 3-inch drain connected to 3-inch Schedule 40 pipe. The pipe lies under the floor where the two drains join before entering the tank (approximately 30 feet). The 3-inch Schedule 40 return line is gravity fed with a minimum slope of 1/4-inch per foot.

The remainder of the plumbing on this tank consists of a 2-inch suction line running from the tank bottom to the tank top, continuing 3 inches above ground with an OPW fitting attached. The suction line is where the contracted oil recycling company removes the oil from the tank. It should be noted that the suction line showed a lot of movement, indicating it was loose. OHM feels the movement in the line was due to the use of a rubber section of 2-inch suction hose which was used as a coupler in order to prevent the line from being broken from possible stress applied to it by the recycling contractors. The rubber hose was attached to the pipe above ground by use of a hose clamp. It is unknown how the rubber hose is attached to the pipe below the ground. A Red Jacket pump was also installed on the tank top, but it is unknown if any lines run off of this pump.

The tank is located next to a loading dock outside Building 4100. The tank top is 32-inches below grade with a sand and concrete overburden. The tank area is secured so traffic cannot drive over the tank. The tank has a 3,000-gallon capacity with dimensions of 72 inches in diameter and 13 feet 6 inches in length. These dimensions are documented on the manufacturer's blueprint.

A blueprint of the tank system is maintained by AC. The print shows the feed pipe into the tank from the waste solvent dumping station. The blueprint does not show the vent pipe, the original fill pipe, or any plumbing that may exist from the Red Jacket pump installed in the tank.

4.3.2 Construction

The tank was manufactured by Clawson Tank Company, Clarkston, Michigan, per Underwriters Laboratory (UL) specifications, Document Number 58. Ancillary equipment design standards are unavailable. The tank and ancillary equipment is constructed of mild steel which is compatible with the tank contents.

4.3.3 Contents

Tank 4025 contains waste or spent stoddard solvent. Stoddard solvent is a widely used solvent, especially for dry cleaning. The United States Bureau of Standards and ASTM D484-52 define it as a petroleum distillate, clear and free from suspended matter and undissolved water and free from rancid and objectionable odor. The minimum flash point is 100 degrees Fahrenheit. Insoluble in water, it is miscible with absolute alcohol, benzene, ether, chloroform, carbon tetrachloride, carbon disulfide, and oils except castor oil. It is also called white spirits.

Analyses of the tank contents in April 1986, showed that it contained low levels of metals. The complete report by Barmah Technical Services Inc., Pontiac, Michigan, is included in Appendix A.

4.3.4 Assessment Results

The tank is protected from corrosion in the following ways:

- o Electrical isolation of all openings
- o The tank exterior received a SSPC-SP-6 grade sand blast followed by one multi-pass coat of Corrocate II polyurethane coating applied to heads at 15 mils D.F.T. and shell at 10 mils D.F.T.

- o Cathodic protection provided by use of sacrificial magnesium anodes wired to tank heads

The following assessment test results are reported:

- o Age: 3 years, documented from a blueprint
- o Volumetric leak test of tank, including vent, original fill, and 6 feet of return line from the tank top to Complex 4 (performed August 20, 1986, by OHM; see Appendix C): -0.046 gph (certifiable at the time of the test)
- o Volumetric leak test of feed line from the wall of Complex 4 to the two dumping stations inside the building: -0.0036 gph (certifiable at the time of the test)

As noted, Tank 4025 is newer than the previous two tanks discussed. Based on the leak test results, the tank, return line, vent, fill, and suction pipes are not leaking. The tank design specifications are known; however, information does not exist on the ancillary equipment installation. The tank system is structurally sound at this time and is considered fit for use.

4.4 TANK 5009

This system is used for collecting waste fuels created during fuel pump testing at the Engineering Building in Complex 5. The tank is located in a tank farm adjacent to Building 5114 in Complex 5.

4.4.1 Description

Ancillary equipment includes the return line that begins at the tank top and is plumbed into an open 4- by 4-foot concrete trench. This concrete-lined trench extends an estimated 100 feet then turns 90 degrees and runs another estimated 300 feet next to Complex 5. The return pipe ends in a 15-foot high vent pipe. Flow to the tank can be visually monitored by AC through the steel grates that cover the trench.

The trench's primary purpose is to contain the fuel lines feeding the test cells in nearby facilities. The trench is set up throughout its entire length with a vapor detection system manufactured by the United States Riley Corp., Panalarm Division, Skokie, Illinois. The system is engineered to trigger an alarm if vapors present in the trench reach 10 percent of the lower explosive limit (LEL), and shuts down the entire tank farm if 60 percent of the LEL is reached. The trench has corrugated steel grating over it so the entire trench may be visually inspected. There are three locations where lines "T" off the return line to enter the test lab in Building 5113. These three locations in Building 5113 are where the scrap fuel enters the system. All pipes in the test cells are above ground and visually inspected daily by AC.

The burial depth of the tank is 32 inches from the tank top to grade, with sand as an overburden and as a backfill. The tank area is secured so traffic may not drive over the tank. The tank has a 2,000-gallon capacity with dimensions of 64-inches in diameter and 12-feet in length. These dimensions are documented on the manufacturer's blueprint.

4.4.2 Construction

The tank and ancillary equipment are constructed of mild steel. The tank was manufactured by Clawson Tank Company following the UL specification Document Number 58. Ancillary equipment design standards have not been located by AC and will be considered unavailable.

A 2-inch vent pipe runs off the tank top, underground to a proper location 20 feet away, where it rises 15 feet above grade. A 3-inch fill pipe also comes off of the tank top and travels approximately 50 feet underground to a loading station. The fill pipe is not used at this time. AC stated they will disconnect the fill pipe line from the tank and place permanent caps on the ends. A 2-inch pipe runs from the inside tank bottom to grade and has a 2-inch OPW fitting attached. This line is used by the contracted oil recovery firms to remove waste fuel from the tank.

4.4.3 Contents

Planned AC use of the tank includes the following components:

Fluid	Quantity (gal/mo)
Stale Gas	150
Ethanol	20
Isobutanol	3
Methanol	25
Toluene	10
Iso-Octane	10
Tert-Butyl Hydroperoxide	1
Tert-Butyl Disulfide	1
Absolute Ethanol	1
Di-Isobutylene	5
Formic Acid	1
Thiophene	1
Methyl Tertiary	1
Iso-Propyl Alcohol	1

Fluid	Quantity (gal/mo)
Diesel Compliance Fuel	10
Stoddard Solvent	100
N-Pentane	200
L4264B Test Fluid	20
Waste Oil	7
Solax	4
Heater Oil	2
Depolarized Test Fluid	2
Tap Water	3

An analysis of the tank contents is included in the Burmah Technical Services Inc. report dated October 16, 1986, included in Appendix A.

4.4.4 Test Results

Corrosion protection of the tank is provided by the following:

- o Electrical isolation of all openings
- o Exterior received a SSPC-SP-6 grade sandblast followed by one multi-pass coat of Corrocate II polyurethane coating applied to heads at 15 mils D.F.T. and shell at 10 mils D.F.T.
- o Cathodic protection provided by use of sacrificial magnesium modes wired to tank heads

The following assessment test results are reported:

- o Age: 4 years, documented from a blueprint
- o Volumetric leak test of tank and feed line: +0.007 gph (certifiable at the time of the test)
- o Results of volumetric (Petro-Tite) tank test of the ancillary equipment are as follows:
  - The 3-inch fill line cannot be tested due to air pockets in the line. The fill pipe is connected to the loading station. AC intends to isolate this line from the system in a proper manner.
  - Return line from tank to West trench (20 feet of line): -.0070 gph (certifiable at the time of the test)

- Vent pipe: -.0260 gph (certifiable at the time of the test)

- For the three lines that "T" off the return line:

  North line/Cell Room No. 4: -.0065 gph (certifiable at the time of the test)

  Middle line/Cell Room No. 3: -.0075 gph (certifiable at the time of the test)

  South line/Cell Room No. 2: -.0090 gph (certifiable at the time of the test)

Tank 5009 is judged suitable for use.

4.5 TANK 5024

This tank is used to store waste oil generated during engine testing, plus general waste oils generated from the Engineering Building in Complex 5.

The tank is located on the south side in the east fuel trench. The trench is surrounded by concrete and measures approximately 6-feet wide by 8-feet deep by 200-feet long. The primary purpose of the trench is to contain the fuel lines from tank farms feeding the test cells in nearby facilities. The trench is set up throughout its entire length with a vapor detection system manufactured by the United States Riley Corp., Panalarm Division, Skokie, Illinois. The system is engineered to trigger an alarm if 10 percent of the LEL in the trench is reached, and shuts down the entire tank farm if 60 percent of the LEL is reached. The trench is covered with corrugated steel grating so the entire trench may be visually inspected.

4.5.1 Description

Ancillary equipment includes one return pipe that extends from the tank top, underground, and into the Dyno Building (approximately 30 feet) where waste oil is pumped into the system.

Because the tank is lying in the open east trench, it has no surrounding backfill and all ancillary equipment can be visually inspected.

The other plumbing on the tank is a 2-inch vent pipe which rises 10 feet above grade directly off the tank top and a 2-inch remote suction line. Both lines are contained in the east trench and visually monitored on a daily basis by AC. The vent pipe rises directly off the tank top by 10 feet and then is plumbed 180 degrees back into the trench area where it ends in order to contain any discharges which may occur. The suction line rises 2 feet off the tank top then extends horizontally to the end of the trench approximately 15 feet. The suction line is used for removing waste oil from the tank by a local contractor and feeding waste oil into the tank from drums by AC.

The tank sits in the trench with the top approximately 2 feet below grade. There is no traffic on or around the tank. The tank is a 1,000-gallon capacity with dimensions of 48 inches in diameter and 12 feet in length. These dimensions are documented on the manufacturer's blueprint.

4.5.2 Construction

Manufactured by Clawson Tank Company in accordance with UL specifications listed in Document Number 58, the tank and ancillary equipment are constructed of mild steel. Ancillary equipment design standards have not been located by AC and will be considered unavailable. The tank and ancillary equipment materials of construction are compatible with the tank contents.

4.5.3 Content

In a laboratory report from July 6, 1987, Burmah Technical Services Inc. analyzed the tanks waste oil. Their report is included in Appendix A.

4.5.4 Test Results

As in other recent tank installations, Tank 5024 is protected from corrosion by the following:

- Electrical isolation of all openings
- Exterior received a SSPC-SP-6 grade sandblast followed by one multi-pass coat of Corrocote II polyurethane coating applied to the heads at 15 mils D.F.T. and shell at 10 mils D.F.T.
- Cathodic protection provided by use of sacrificial magnesium modes wired to tank heads.

The following assessment test results are reported:

- Age: 2 years per blueprint
- Volumetric leak test of tank including the suction and vent pipes: -0.041 gph (certifiable at the time of the test)

The documentation provided on the tank design and leak detection methods on this system are favorable. Along with other general information and the Petro-Tite tank test showing the tank system to be tight at this time, the tank system is considered structurally sound and fit for use.

5.0 CONCLUSIONS

A thorough tank assessment of the five tanks which AC uses to store hazardous wastes (in accordance with the 40 CFR 264.191 regulations) has been completed by OHM. Based on OHM's extensive past experience and knowledge of underground storage tanks, OHM concludes that Tank 4016 should be removed from service as a hazardous wastes tank. Tank Nos. WT003, 4025, 5009, and 5024 are suitable for use at this time.

TANK 5024

TANK TEST

SHEET ____ OF ____

Data Chart for Tank System Tightness Test

petro tite TANK TESTER

5626
OHM PROJECT NO.

M091
SERIAL NO. OF TEST UNIT

PLEASE PRINT

1. AC Sparkplug — Name of Supplier, Owner or Dealer | Address (No. and Street) | Flint — City | Mich — State | Date of Test

2. TANK TO TEST
5024 — Location by Position
Dump tank — Brand and Grade

3. CAPACITY
Nominal Capacity 2000 Gallons
By most accurate capacity chart available 2005 Gallons
Is there doubt as to True Capacity? ☐
See Section "DETERMINING TANK CAPACITY"

From:
☐ Station Chart
☒ Tank Manufacturer's Chart
☐ Company Engineering Data
☐ Charts supplied with petro tite
☐ Other ____

4. FILL-UP FOR TEST

Stick Water Bottom before Fill-up — to ⅛ in. — Gallons —

Depth of Groundwater 134" to water
Hgt Above Grade - Low Level 40"
Tank Diameter 64"
Product in full tank (up to fill pipe)

Stick Readings to ⅛ in. | Total Gallons
Inventory 2005
Water
Equip. Allow + 3
Grand Total Gallons 2008

5. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

Vapor Recovery System ☐ Stage I ☐ Stage II
☐ Water in tank ☐ High water table in tank excavation ☐ Line(s) being tested with LVLLT

API Hydrometer - Gravity 55.9
Product Temperature 32
API/60° F - Table "A" 59.3
Coefficient Expansion - Table "B" .00060863

6. TANK MEASUREMENTS FOR TSTT ASSEMBLY
Bottom of tank to Grade* 113"
Add 30" for 4" L ....
Add 24" for 3" L or air seal ....
Total tubing to assemble Approximate 180

7. EXTENSION HOSE SETTING
Tank top to grade* 48"
Extend hose on suction tube 6" or more below tank top
*If Fill pipe extends above grade, use top of fill

8. TEMPERATURE/VOLUME FACTOR (a) TO TEST THIS TANK.
Is Today Warmer? ☐ Colder? ☐ __° F Product in Tank __° F Fill-up Product on Truck __° F Expected Change (+ or -)

9. Thermal-Sensor reading after circulation 4934 digits | 36-37 Nearest ° F | 1066 Sensor Unit #

10. Digits per °F in range of expected change 297 digits

11. 2008 total quantity in full tank (16 or 17) × .00060863 coefficient of expansion for involved product (Table B) = 1.222129 volume change in this tank per °F gallons

12. 1.222129 volume change per °F (24) ÷ 297 Digits per °F in test Range (23) = .0041149 Volume change per digit. Compute to 4 decimal places. This is test factor (a)

14 Date / Time (24 hr)	15 Record details of setting up and running test. (Use full length of line if needed.)	16 Reading No.	17 Hydrostatic Pressure Control: Standpipe Level in Inches — Beginning of Reading	Level to which Restored	18/19 Product in Graduate — Before Reading	After Reading	20 Product Replaced (-) Product Recovered (+)	21/22 Temperature Compensation: Thermal Sensor Reading	23 Change Higher + Lower - (t)	24 Computation (t) × (a) = Expansion + Contraction -	25 Net Volume Changes Each Reading	26 Accumulated Change
1000	TB, BC Arrived at Engineering bld tank farm. Plumbers have connected vent lines											
	and gravity return lines to tank system, leaving remote fill line off.											
1030	We began setup and asked to have lines to tank #9 broken in trench under walkway											
1130	Tank #8 is missing a 2½" plug on tank top, plumbers still trying to locate											
	one with Nylon seal. TK asked if we could drill and tap manway on											5024
	after they removed it, said we would											
1320	Unable to begin test on tank #8 due to delays of Nylon seated 2½" plug											
1310	Began Circulation											
1255	Initial Reading	1		42		1.00		4934	Factor	A	.0041	
		2	40.4	42	1.00	.840	-.160	940	+6	+.025	-.185	
		3	40.7	42	.840	.710	-.130	945	+5	+.021	-.151	
		4	40.9	42	.710	.600	-.110	951	+6	+.025	-.135	
		5	41.4	42	.600	.550	-.050	960	+9	+.037	-.087	
		6	41.7	42	.550	.525	-.025	964	+4	+.016	-.041	
	Drop to low level											
		7	12.9	12	.525	.575	+.050	969	+5	+.021	+.029	
		8	12.3	12	.575	.590	+.015	973	+4	+.016	-.001	
		9	12.2	12	.590	.600	+.010	979	+6	+.025	-.015	
		10	12	12	.600	.600	+.000	985	+6	+.025	-.025	.041 GPH
		11	12	12	.600	.600	+.000	985	+0	+.000	+.000	

NOTE.

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

T. Bash
Brian Conley
Technicians

OHM
THE ENVIRONMENTAL SERVICES COMPANY
O H MATERIALS CORP
CORPORATE HEADQUARTERS FINDLAY OHIO
800-537-9540 (24 Hours)

T C Bash — By Signature
12/10/84 — Technicians Certification No.

TANK 5009

TANK TEST

RETURN LINE FROM TANK
TO WEST TRENCH

NORTH LINE

VENT LINE

MIDDLE LINE

SOUTH LINE

Data Chart for Tank System Tighiness Test

SHEET ___ OF ___

petro tite TANK TESTER

OHM PROJECT NO. 5626

SERIAL NO. OF TEST UNIT M091

PLEASE PRINT

1 AC Spark Plug — Flint — Michigan — 1-12-88

2 TANK TO TEST: Tank #5009 Engineering test Area — Waste oil tank test w/Unleaded Fuel

3 CAPACITY: Nominal Capacity 2,000 — By chart 2,005 Gallons

From: ☐ Station Chart ☑ Tank Manufacturer's Chart ☐ Company Engineering Data ☐ Charts supplied with petro tite ☐ Other

Is there doubt as to True Capacity? ☐ See Section "DETERMINING TANK CAPACITY"

4 FILL-UP FOR TEST

Stick Water Gallons before Fill-up: 0 (to ¼ in.) 0 (Gallons)

Depth of Groundwater: 137 — Hgt. Above Grade - Low Level: 40"

Tank Diameter: 64"

	Stick Readings	Total Gallons
Inventory		2,005
Water		0
Equip., Allow.		3
Grand Total		2,008

5 SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

Vapor Recovery System ☐ Stage I ☐ Stage II

☐ Water in tank ☐ High water table in tank excavation ☐ Line(s) being tested with LVLLT

API Hydrometer - Gravity 56.7

Product Temperature 38°F

API/60°F - Table "A" 59.4

Coefficient Expansion - Table "B" .00060934

6 TANK MEASUREMENTS FOR TSTT ASSEMBLY

Bottom of tank to Grade: 113

Add 30" for 4" L

Add 24" for 3" L or air cool

Total tubing to assemble: 180

7 EXTENSION HOSE SETTING: 48

8 TEMPERATURE/VOLUME FACTOR (a) TO TEST THIS TANK

Is Today Warmer? ☐ Colder? ☐

9 Thermal-Sensor reading after circulation: 04056 — 32/33 °F — 1066

10 Digits per °F in range of expected change: 294

11 2,008 × .00060934 = 1.2235547 (gallons) — total quantity in full tank (16 or 17) × coefficient of expansion for involved product (Table B) = volume change in this tank per °F

12 1.2235547 ÷ 294 = .0041618 — volume change per °F (24) ÷ Digits per °F in total Range (23) = Volume change per digit. Compute to 4 decimal places. This is total factor (a)

13 LOG OF TEST PROCEDURES

14 Time	15 Record details of setting up and running test. (Use full length of line if needed.)	16 Reading No.	17 Beginning of Reading	Level to which Restored	19 Before Reading	After Reading	20 Product Replaced (+)	22 Thermal Sensor Reading	23 Change	24 Compensation	25 Net Volume Change Each Reading	26 Accumulated Change
	All lines broken at tank top. Testing tank only. Temperatures started the day approx. 30°F + seemed to rise as the day progressed. Tank top exposed.											
1700	Begin Circulation								.0042			
1710	Initial Reading	1		42		.940		04056				
1725		2	42.5	42	.940	.960	+.020	020	-36	-.151	+.171	
1740	Adjusted jet direction	3	43.4	42	.900	.960	+.060	028	+8	+.034	+.026	
1755		4	44.0	42	.700	.780	+.080	040	+12	+.050	+.030	
1810		5	43.3	42	.780	.840	+.060	052	+12	+.050	+.010	
1825		6	43.7	42	.840	.905	+.065	071	+19	+.080	-.015	
	Drop to Low Level			12		Digits per °F	change - NO CHANGE TO			FACTOR	A	
1840		7	13.6	12	.110	.170	+.060	084	+13	+.055	+.005	
1855		8	13.9	12	.170	.240	+.070	102	+18	+.076	-.006	
1910		9	14.0	12	.240	.320	+.080	120	+18	+.076	+.004	+.007/hr.
1925		10	13.8	12	.320	.390	+.070	136	+16	+.067	+.003	
1940		11	13.8	12	.390	.455	+.065	150	+14	+.059	+.006	"Tight"

NOTE:

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329

B. Conley
T. Bush
Technicians

OHM
THE ENVIRONMENTAL SERVICES COMPANY
O H MATERIALS CORP
CORPORATE HEADQUARTERS FINDLAY OHIO

Brian M. Conley
By Signature

122110705
Technician Certification No.

TANK TEST

OHM
O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

562ke
OHM PROJECT NO.

SERIAL NO. OF TEST UNIT

1 LOCATION: AC Spark plug Flint Mich
Street No. and/or Corner · City · State · Telephone No.

2 OWNER: Engineering Bld - Tank Farm
Name · Address · Representative · Position · Telephone No.

3 OPERATOR:
Name · Dealer, Mgr. or Other · Address (if different than Location) · Telephone No.

4 REASON FOR TEST

5 TEST REQUESTED BY: Can only see approx. 2' of each end of line; Overall 25'
Name · Position · Order No. · Billing Address

6 SPECIAL INSTRUCTIONS: 2" line capped at tank & in Trench

7 COVER OVER LINES: Sand
CONCRETE, ASPHALT, ETC

APPROXIMATE BURIAL DEPTH: 30"

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☒ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS: 2" dumpline Tank #9

10 WEATHER: Cold 19° TEMPERATURE IN TANKS ____ °F ____ °C

DATE OF TEST: Year 88 Mo. 1 Day 12

OWNER: Name
LOCATION: State · City · State

RETURN LINE FROM TANK TO WEST TRENCH

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	14 PRESSURE psi OR kPa AFTER	15 VOLUME READING BEFORE	15 VOLUME READING AFTER	15 VOLUME NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
2" dump line tank #9, from tank to trench.								
	1745			30		.0750		
	1800		8	30	.0750	.0715	-.0035	-.0070 Tight
	1815		8	30	.0715	.0700	-.0015	
	1830		9	30	.0700	.0690	-.0010	
	1845		9	30	.0690	.0680	-.0010	
								Bleed back .0068 = .0069

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

By: Signature
122110184
Technicians Certification No.

Tim Bach
Brian Conley
Technicians

OHM
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS: FINDLAY, OHIO
800-537-9540 (24 Hours)

OHM
O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST
petro tite
LINE TESTER

56226
OHM PROJECT NO.

MLT-07
SERIAL NO. OF TEST UNIT

1 LOCATION: AC GM Sparkplug Flint Mich
Street No. and/or Corner | City | State | Telephone No.

2 OWNER:
Name | Address | Representative | Position | Telephone No.

3 OPERATOR:
Name | Dealer, Mgr. or Other | Address (if different than Location) | Telephone No.

4 REASON FOR TEST
Gas test CELL Room #4 2" dump line to tank #9

5 TEST REQUESTED BY: Tested with Gas
Name | Position | Order No. | Billing Address

6 SPECIAL INSTRUCTIONS: of 3 lines this line is the North Line

7 COVER OVER LINES Concrete floor (CONCRETE, ASPHALT, ETC) APPROXIMATE BURIAL DEPTH 10" inside bld.

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☒ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS N/A

10 WEATHER ______ TEMPERATURE IN TANKS ______ °F ______ °C

OWNER: Name
LOCATION: State, City, State
DATE OF TEST: Day, Mo., Year

NORTH LINE

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	AFTER	15 VOLUME READING BEFORE	AFTER	NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
	1145			30		.0385		
	1200		8	30	.0385	.0325	-.0060	
	1215		4	30	.0325	.0280	-.0045	
	1230	Fixed leak in Line	6	30	.0280	.0255	-.0025	
	1245		20	30	.0255	.0230	-.0025	-.0065/hr.
	1300		25	30	.0230	.0220	-.0010	"Tight"
	1315		26	30	.0220	.0215	-.0005	
	1317	Bleedback check	30	0	.0215	.0250	+.0035	OK

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By: Signature B. Conley
Technicians Certification No. 1281107-05

B. Conley
T. Bash
Technicians

OHM
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS: FINDLAY, OHIO
800-537-9540 (24 Hours)

OHM

O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

5626
OHM PROJECT NO.

MLt-67
SERIAL NO. OF TEST UNIT

1 LOCATION: 1300 N. Dort Highway (Street No. and/or Corner) Flint (City) Michigan (State) Telephone No.

2 OWNER: AC Spark Plug (Name) Same (Address) Representative Position Telephone No.

3 OPERATOR: Name Dealer, Mgr. or Other Address (If different than Location) Telephone No.

4 REASON FOR TEST

5 TEST REQUESTED BY: Name Position Order No. Billing Address

6 SPECIAL INSTRUCTIONS:

7 COVER OVER LINES Sand (CONCRETE, ASPHALT, ETC.) APPROXIMATE BURIAL DEPTH 3'-4'

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☑ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS Remote

10 WEATHER Cold Clear 25°F TEMPERATURE IN TANKS ____ °F ____ °C

OWNER: Name
LOCATION: State MICH; City Flint
DATE OF TEST: Year 88; Mo 1; Day

VENT LINE

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	14 PRESSURE psi OR kPa AFTER	15 VOLUME READING BEFORE	15 VOLUME READING AFTER	15 VOLUME NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
Vent Line for tank #5009								
	1545	Begin test	[illegible]	30		.059		
	1600		3	30	.0590	.0470	.0120	
	1615		4	30	.0470	.0410	.0060	-.0260
	1630		4	30	.0410	.0365	.0045	Not Certifiable
	1645			30	.0365	.0330	.0035	
								Bleed BACK
								.0330 -.0270

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

E. Bach
By: Signature

122110184
Technicians Certification No.

Tim Bastl
Brian Conley
Technicians

OHM
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS: FINDLAY, OHIO
800 537 9540 (24 Hours)

OHM

O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

5626
OHM PROJECT NO.

MLT07
SERIAL NO. OF TEST UNIT

1 LOCATION: AC GM Sparkplug (Street No. and/or Corner) Flint (City) Mich (State) ___ Telephone No.

2 OWNER: ___ Name ___ Address ___ Representative ___ Position ___ Telephone No.

3 OPERATOR: ___ Name ___ Dealer, Mgr. or Other ___ Address (if different than Location) ___ Telephone No.

4 REASON FOR TEST: Gas Test Cell Room #3 2" dump Line to tank #9

5 TEST REQUESTED BY: Tested with Gas (Name) ___ Position ___ Order No. ___ Billing Address

6 SPECIAL INSTRUCTIONS: 2" Dump line of 3 lines this is the Middle Line

7 COVER OVER LINES: Concrete (CONCRETE, ASPHALT, ETC) APPROXIMATE BURIAL DEPTH: 10"

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☒ No

9 MAKE AND TYPE OF PUMP OR DISPENSERS: N/A line in floor of Bld

10 WEATHER ___ TEMPERATURE IN TANKS ___ °F ___ °C

OWNER — Name:

LOCATION — City: Flint State: Mich

DATE OF TEST — Year: 88 Mo.: 1 Day:

MIDDLE LINE

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	14 PRESSURE psi OR kPa AFTER	15 VOLUME READING BEFORE	15 VOLUME READING AFTER	15 VOLUME NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
	1000			30		.0870		
	1015		0	30	.0870	.0825	.0045	
	1030		5	30	.0825	.0820	.0005	-.00755
	1045		14	30	.0820	.080	.0020	Tight line
	1100		18	30	.0800	.0790	.0010	Bleed Back
								.079 to .082
								+.003 ok

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

By: Signature: [signature]

Technicians Certification No: 1221084

Technicians: [signature]

OHM
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS: FINDLAY, OHIO
800-537-9540 (24 Hours)

SOUTH LINE

OHM

O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

5626
OHM PROJECT NO.

MLT-07
SERIAL NO. OF TEST UNIT

OWNER		LOCATION		DATE OF TEST		
Name		State: Mich	City: Flint	Year: 88	Mo.: 1	Day

1 LOCATION: AC GM Sparkplug (Street No. and/or Corner) Flint (City) Mich (State) ____ Telephone No.

2 OWNER: ____ Name ____ Address ____ Representative ____ Position ____ Telephone No.

3 OPERATOR: ____ Name ____ Dealer, Mgr. or Other ____ Address (if different than Location) ____ Telephone No.

4 REASON FOR TEST: South line of the 3 lines tested off of return line (dump line)

5 TEST REQUESTED BY: ____ Name ____ Position ____ Order No. ____ Billing Address

6 SPECIAL INSTRUCTIONS: Gas test Cell Room #2, 2" dump line to tank # 9

7 COVER OVER LINES: Concrete floor in bld. (CONCRETE, ASPHALT, ETC.) APPROXIMATE BURIAL DEPTH ____

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☒ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS: 2" dump line to tank # 9

10 WEATHER ____ TEMPERATURE IN TANKS ____ °F ____ °C

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	14 PRESSURE AFTER	15 VOLUME READING BEFORE	15 VOLUME READING AFTER	NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
	tank	#9						
1015				30				
1030			20.0	30	.0098	.0094	-.0040	
1045			18.0	30	.094	.092	.0020	
1100			20.0	30	.0920	.0905	.0015	→ 0.0090 Tight line
1115			20.0	30	.0905	.0890	.0015	
								Bleed back
								.0890 - .1300 .041

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329

By: Signature: [signature]
Technicians Certification No. 122110184

Technicians: Brian Conley

OHM
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS: FINDLAY, OHIO
800-537-9540 (24 Hours)

APPENDIX E

FINANCIAL ASSURANCE SUBMISSION

General Motors Corporation

Mr. John Buhunski, Chief Compliance Section
Michigan Department of Natural Resources
Hazardous Waste Division
P.O. Box 30038
Lansing, MI 48909

Dear Mr. Behunski:

I am the chief financial officer of General Motors Corporation, 3044 West Grand Boulevard, Detroit, Michigan 48202. This letter is in support of the firm's use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Part 7 of the Act 64 Administrative Rules.

1. The firm is the owner or operator of the following facilities for which liability coverage is being demonstrated through the financial test specified in Subpart H of 40 CFR Part 264. See Attachment MI.

2. The firm owns or operates the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in Part 7 of the Act 64 Administrative Rules. The current closure and/or post-closure cost estimates covered by the test are shown for each facility: See Attachment MI, A and B.

3. This firm guarantees, through the corporate guarantee specified in Part 7 of the Act 64 Administrative Rules, closure and post-closure care of the following facilities owned or operated by its subsidiaries. The current cost estimates for closure or post-closure care so guaranteed are shown for each facility: None.

4. In other states where EPA is not administering the financial requirements of Subpart H of 40 CFR Part 264, this firm, as owner or operator or guarantor, is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test equivalent or substantially equivalen to the financial test specified in Subpart H of 40 CFR Part 264. The current closure and/or post-closure estimates covered by such a test are shown for each facility: See Attachment B.

9275f-91

5. In states where EPA is administering the financial requirements of Subpart H of 40 CFR Part 264, this firm, as owner or operator or guarantor, is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of the financial test specified in Subpart H of 40 CFR Part 264. The closure and/or post-closure cost estimates covered by this test are shown for each facility: See Attachment A.

6. This firm is the owner or operator of the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to EPA or a state through the financial test or any other financial assurance mechanism specified in Subpart H of 40 CFR Part 264 or equivalent of substantially equivalent state mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: None.

This firm is required to file a Form 10-K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 1987.

ALTERNATIVE I
($ In Millions)

1.	Sum of current closure and post-closure cost estimates (total of all cost estimates listed above)	$ 59.1
2.	Amount of annual aggregate liability coverage to be demonstrated	$ 8.0
3.	Sum of lines 1 and 2	$ 67.1
*4.	Total liabilities (if any portion of your closure or post-closure cost estimates is included in your total liabilities, you may deduct that portion from this line and add that amount to lines 5 and 6)	$ 54,196.8
*5.	Tangible net worth	$ 28,038.7
*6.	Net worth	$ 33,225.1
*7.	Current assets	$ 39,771.5
*8.	Current liabilities	$ 25,528.2
9.	Net working capital (line 7 minus line 8)	$ 14,243.3
*10.	The sum of net income plus depreciation, depletion, and amortization	$ 9,662.9
*11.	Total assets in U.S. (required only if less than 90% of assets are located in the U.S.)	$ 68,168.1

		YES	NO
12.	Is line 5 at least $10 million?	X	
13.	Is line 5 at least 6 times line 3?	X	
14.	Is line 9 at least 6 times line 3?	X	
*15.	Are at least 90% of assets located in the U.S.? If not complete line 16.		X
16.	Is line 11 at least 6 times line 3?	X	
17.	Is line 4 divided by line 6 less than 2.0?	X	
18.	Is line 10 divided by line 4 greater than 0.1?	X	
19.	Is line 7 divided by line 8 greater than 1.5?	X	

I hereby certify that the wording of this letter is identical to the wording in model letter specified by the Director for the financial test related to closure/post-closure care as well as liability insurance coverage, as such letter was specified on the date shown immediately below.

F. A. Smith
Executive Vice President
March 30, 1988

ATTACHMENT MI

U.S. EPA REGION V

MICHIGAN

EPA ID: MID980568745
Facility Name: GMC AC SPARK PLUG: FLINT AVERILL AVE.
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 4134 DAVISON ROAD, County: GENESEE
Current closure cost estimate: $568,300

EPA ID: MID005356647
Facility Name: GMC AC SPARK PLUG: FLINT DORT HWY.
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 1300 N. DORT HIGHWAY, County: GENESEE
Current closure cost estimate: $85,400

EPA ID: MID980568570
Facility Name: GMC AC SPARK PLUG: FLINT WASTEWATER TRTMT PL
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 3026 ROBERT T. LONGWAY BLVD., County: GENESEE
Current closure cost estimate: $19,900

EPA ID: MID980568620
Facility Name: GMC AC SPARK PLUG: FLINT ENGINEERING
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 3026 ROBERT T. LONGWAY BLVD., County: GENESSE
Current closure cost estimate: $8,500

U.S. EPA REGION V

MICHIGAN

EPA ID: MID005356704
Facility Name: GMC BOC: DETROIT CLARK AVE.
Mailing Address: 2860 CLARK AVE.
DETROIT, MI 48210
Facility Location: 2860 CLARK AVENUE, County: WAYNE
Current closure cost estimate: $95,000

EPA ID: MID005356712
Facility Name: GMC BOC: FLINT OPERATIONS
Mailing Address: 902 E. HAMILTON
FLINT, MI 48550
Facility Location: 902 EAST HAMILTON BLDG. 85, County: GENESEE
Current closure cost estimate: $565,500

EPA ID: MID000718544
Facility Name: GMC BOC: LAKE ORION
Mailing Address: P.O. BOX 347
LAKE ORION, MI 48053
Facility Location: 4555 GIDDINGS ROAD, County: OAKLAND
Current closure cost estimate: $122,000

EPA ID: MID005356894
Facility Name: GMC BOC: LANSING PLANT 1
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 920 TOWNSEND STREET, County: INGHAM
Current closure cost estimate: $40,000

U.S. EPA REGION V

MICHIGAN

EPA ID: MID980700827
Facility Name: GMC BOC: LANSING PLANT 2 & 3
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 2800 & 2801 W. SAGINAW STREET, County: INGHAM
Current closure cost estimate: $65,800

EPA ID: MID980700843
Facility Name: GMC BOC: LANSING PLANT 5
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 2901 SOUTH CANAL ROAD, County: EATON
Current closure cost estimate: $67,600

EPA ID: MID041793340
Facility Name: GMC CENTRAL FOUNDRY: SAGINAW GREY & NODULAR
Mailing Address: 2100 VETERANS MEMORIAL PARKWAY
SAGINAW, MI 48601
Facility Location: 2100 VETERANS MEMORIAL PARKWAY, County: SAGINAW
Current closure cost estimate: $36,100

EPA ID: MID005356696
Facility Name: GMC CENTRAL FOUNDRY: SAGINAW MALLEABLE IRON
Mailing Address: 77 W. CENTER ST.
SAGINAW, MI 48605
Facility Location: 77 W. CENTER STREET, County: SAGINAW
Current closure cost estimate: $54,200

MICHIGAN

EPA ID: MID005356688
Facility Name: GMC CPC: BAY CITY
Mailing Address: 100 FITZGERALD ST.
BAY CITY, MI 48708
Facility Location: 100 FITZGERALD STREET, County: BAY
Current closure cost estimate: $65,000

EPA ID: MID005356886
Facility Name: GMC CPC: PONTIAC
Mailing Address: ONE PONTIAC PLAZA
PONTIAC, MI 48053
Facility Location: ONE PONTIAC PLAZA, County: OAKLAND
Current closure cost estimate: $75,000

EPA ID: MID005356910
Facility Name: GMC CPC: PONTIAC FIERO ASSEMBLY
Mailing Address: 900 BALDWIN AVE.
PONTIAC, MI 48058
Facility Location: 900 BALDWIN AVENUE, County: OAKLAND
Current closure cost estimate: $73,000

EPA ID: MID000809905
Facility Name: GMC CPC: ROMULUS
Mailing Address: 36880 ECORSE RD.
ROMULUS, MI 48174
Facility Location: 36880 ECORSE ROAD, County: WAYNE
Current closure cost estimate: $49,100

MICHIGAN

EPA ID: MID005356845
Facility Name: GMC DELCO MORAINE: SAGINAW MANUFACTURING
Mailing Address: 2328 E. GENESEE AVE.
SAGINAW, MI 48601
Facility Location: 2328 EAST GENESEE AVENUE, County: SAGINAW
Current closure cost estimate: $31,000

EPA ID: MID005356621
Facility Name: GMC DELCO PRODUCTS: LIVONIA
Mailing Address: 13000 ECKLES RD.
LIVONIA, MI 48151
Facility Location: 13000 ECKLES ROAD, County: WAYNE
Current closure cost estimate: $287,000

EPA ID: MID005356860
Facility Name: GMC FISHER GUIDE: FLINT COLDWATER RD.
Mailing Address: 1245 E. COLDWATER RD
FLINT, MI 48559
Facility Location: 1245 EAST COLDWATER ROAD, County: GENESEE
Current closure cost estimate: $2,802,000
Current post-closure cost estimate: $767,900

EPA ID: MID005356654
Facility Name: GMC FISHER GUIDE: FLINT MANUFACTURING
Mailing Address: 300 N. CHEVROLET AVE.
FLINT, MI 48555
Facility Location: 300 NORTH CHEVROLET AVENUE, County: GENESEE
Current closure cost estimate: $182,600

U.S. EPA REGION V

MICHIGAN

EPA ID: MID082220757
Facility Name: GMC GM PROVING GROUND: MILFORD
Mailing Address: HICKORY RIDGE & GM ROAD
MILFORD, MI 48042
Facility Location: HICKORY RIDGE & GM ROAD, County: OAKLAND
Current closure cost estimate: $10,100

EPA ID: MID050615996
Facility Name: GMC GM TECHNICAL CENTER: WARREN
Mailing Address: 30800 MOUND RD. SERVICE SECT.
WARREN, MI 48090
Facility Location: 30800 MOUND ROAD, County: MACOMB
Current closure cost estimate: $164,900

EPA ID: MID000718551
Facility Name: GMC HYDRA-MATIC: THREE RIVERS
Mailing Address: ONE HYDRA-MATIC DRIVE
THREE RIVERS, MI 49093
Facility Location: ONE HYDRA-MATIC DRIVE, County: ST. JOSEPH
Current closure cost estimate: $18,200

EPA ID: MID980587893
Facility Name: GMC HYDRA-MATIC: YPSILANTI
Mailing Address: WILLOW RUN
YPSILANTI, MI 48198
Facility Location: WILLOW RUN, County: WASHTENAW
Current closure cost estimate: $31,800

U.S. EPA REGION V

MICHIGAN

EPA ID: MID084571256
Facility Name: GMC INLAND: ADRIAN MANUFACTURING
Mailing Address: 1450 E. BEECHER STREET
ADRIAN, MI 49221
Facility Location: 1450 E. BEECHER STREET, County: LENAWEE
Current closure cost estimate: $24,700

EPA ID: MID020105565
Facility Name: GMC NEW DEPARTURE HYATT: DETROIT FORGE
Mailing Address: 8435 ST. AUBIN
DETROIT, MI 48212
Facility Location: 8435 ST. AUBIN, County: WAYNE
Current closure cost estimate: $26,700

EPA ID: MID000721738
Facility Name: GMC ROCHESTER PRODUCTS: COOPERSVILLE
Mailing Address: 2100 BURLINGAME
COOPERSVILLE, MI 49404
Facility Location: 999 RANDALL STREET, County: OTTAWA
Current closure cost estimate: $2,100

EPA ID: MID017079625
Facility Name: GMC ROCHESTER PRODUCTS: GRAND RAPIDS
Mailing Address: 2100 BURLINGAME
GRAND RAPIDS, MI 49501
Facility Location: 2100 BURLINGAME, County: KENT
Current closure cost estimate: $52,100

EPA ID: MID086744802
Facility Name: GMC SAGINAW: DETROIT
Mailing Address: 1840 HOLBROOK AVENUE
DETROIT, MI 48212
Facility Location: 1840 HOLBROOK AVENUE, County: WAYNE
Current closure cost estimate: $124,100

U.S. EPA REGION V

MICHIGAN

EPA ID: MID003912920
Facility Name: GMC SERVICE PARTS OPER.: DRAYTON PLAINS
Mailing Address: 6060 W. BRISTOL RD.
DRAYTON PLAINS, MI 48020
Facility Location: 5260 WILLIAMS LAKE ROAD, County: OAKLAND
Current closure cost estimate: $66,400

EPA ID: MID003906773
Facility Name: GMC SERVICE PARTS OPER.: FLINT
Mailing Address: 6060 W. BRISTOL RD.
FLINT, MI 48554
Facility Location: 6060 WEST BRISTOL ROAD, County: GENESEE
Current closure cost estimate: $19,900

EPA ID: MID076380583
Facility Name: GMC TRUCK & BUS: DETROIT ASSEMBLY
Mailing Address: 601 PIQUETTE
DETROIT, MI 48202
Facility Location: 601 PIQUETTE, County: WAYNE
Current closure cost estimate: $40,000

EPA ID: MID005356902
Facility Name: GMC TRUCK & BUS: PONTIAC EAST & CENTRAL
Mailing Address: 660 SOUTH BOULEVARD EAST
PONTIAC, MI 48053
Facility Location: 660 SOUTH BOULEVARD EAST, County: OAKLAND
Current closure cost estimate: $207,800

EPA ID: MID980568836
Facility Name: GMC TRUCK & BUS: PONTIAC WEST
Mailing Address: 660 SOUTH BOULEVARD EAST
PONTIAC, MI 48053
Facility Location: 275 FRANKLIN ROAD, County: OAKLAND
Current closure cost estimate: $51,300

U.S. EPA REGION V

MICHIGAN

EPA ID: MID005356951
Facility Name: GMC TRUCK & BUS: VAN SLYKE COMPLEX
Mailing Address: G 3248 VAN SLYKE RD.
FLINT, MI 48552
Facility Location: G 3248 VAN SLYKE ROAD, County: GENESEE
Current closure cost estimate: $189,600

Deloitte Haskins+Sells

1114 Avenue of the Americas
New York, New York 10036
(212) 790-0500
Telex 12267

General Motors Corporation:

We have examined the Consolidated Balance Sheet of General Motors Corporation (the "Corporation") and consolidated subsidiaries as of December 31, 1987 and the related Statements of Consolidated Income and Changes in Consolidated Financial Position for the year then ended, and have issued our opinion thereon dated February 8, 1988. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. We have not performed any auditing procedures beyond the date of our opinion on the 1987 financial statements; accordingly, this report is based on our knowledge as of that date and should be read with that understanding.

At your request, we have performed the procedures enumerated below with respect to the accompanying letter from Mr. F. A. Smith to the Chief Compliance Section, Michigan Department of Natural Resources, Hazardous Waste Division, dated March 30, 1988. It is understood that this report is solely for filing with the addressee of the accompanying letter, and is not to be used for any other purpose. The procedures that we performed are summarized as follows:

1. We compared the amounts included in items 6, 7, 8 and 11 under the caption Alternative I in the letter referred to above with the corresponding amounts in the financial statements referred to in the first paragraph.

2. We recomputed from, or reconciled to, the financial statements referred to in the first paragraph the information included in items 4, 5, 10 and 15 under the caption Alternative I in the letter referred to above.

Because the procedures referred to in the preceding paragraph were not sufficient to constitute an examination made in accordance with generally accepted auditing standards, we do not express an opinion on any of the information or amounts listed under the caption Alternative I in the aforementioned letter. In performing the procedures referred to above, however, no matters came to our attention that caused us to believe that the information or amounts included in items 4, 5, 6, 7, 8, 10, 11 and 15 should be adjusted.

Deloitte Haskins & Sells

March 30, 1988

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CORPORATION

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Knowledge, and the Creativity to Use It
44808 Helm St. Plymouth, MI 48170 (313) 454-1100 Fax. 454-1233

GENERAL MOTORS CORPORATION
AC ROCHESTER DIVISION
ENGINEERING COMPLEX

HAZARDOUS WASTE STORAGE AREA CLOSURE PLAN

AC Rochester Division
Engineering Complex
General Motors Corporation
1300 North Dort Highway
Flint, Michigan 48556

MID 980 568 620

TPN: 202-8001

October 14, 1988
Revision 1: December 12, 1988
Revision 2: August 6, 1989

TABLE OF CONTENTS

GENERAL MOTORS CORPORATION
AC ROCHESTER DIVISION
ENGINEERING COMPLEX

HAZARDOUS WASTE STORAGE AREA
CLOSURE PLAN

1.0 INTRODUCTION

This closure plan has been developed for the Engineering Complex (MID 980 568 620) of the AC Rochester Division of General Motors Corporation, Flint, Michigan. The Engineering Complex hazardous waste storage areas include a container storage area and two hazardous waste storage tanks. The Engineering Complex hazardous waste storage areas have operated under Part A interim status since submission of a permit application dated November 17, 1980. A request to amend the interim status permit was submitted to the Michigan Department of Natural Resources (MDNR) in October 1988.

The container storage area has been used primarily for the storage of drums and smaller containers of hazardous wastes prior to transportation for disposal. Hazardous waste materials stored in this area have included spent hydrocarbon and chlorinated solvents generated from maintenance and research and development operations. The container storage area has been in continuous operation since 1978.

The Engineering Complex also has a storage tank for waste oils and an underground storage tank for waste gasoline generated from parts testing and other plant operations. The waste oil storage tank has been in operation since it was installed in March 1987, and the waste gasoline storage tank has been in operations since it was installed in December 1983.

The plant has never produced large volumes of containerized hazardous wastes, and this operation does not require that hazardous wastes be stored for more than 90 days. The plant management now wishes to terminate operation of the container storage area as a permitted storage facility. Subsequent to an approved clean closure, the container storage area will be used to accumulate hazardous wastes for less than 90 days in accordance with generator status regulations.

The waste oil storage tank and the waste gasoline underground storage tank are both small enough that the waste materials have been sold for recycling within the 90 day time period; therefore, the facility's management wishes to close these tanks as permitted hazardous waste storage units.

Closure activities for the Engineering Complex hazardous waste storage areas will initially consist of an extensive cleaning at each of the hazardous waste storage areas. This will be followed with a sampling and analysis program to determine if waste management practices during the interim status period have resulted in significant contamination of the underlying soils. If contaminated materials are identified, additional sampling and analysis activities will be conducted as necessary to determine the full extent of the contamination. Remedial actions will be designed and implemented if necessary to effect clean closure.

2.0 SITE DESCRIPTION AND HISTORY

The original Part A permit application was submitted in 1980 under the name of the GMC AC Spark Plug Division Engineering. The name and management of the plant has recently been changed to the AC Rochester Division of General Motors Corporation.

The Part A permit application was amended and submitted to the Michigan Department of Natural Resources in a letter dated October 3, 1988 to correct misinterpretations of the regulations in the original application, to correctly show the areas actually being used to manage hazardous wastes, and to more accurately describe the types of wastes being managed.

2.1 Location

The Engineering Complex of the AC Rochester Division is located at 1601 North Averill Avenue, Flint, Michigan (see Location and Site Pans in Appendix E). The Engineering Complex hazardous waste storage areas include:

1) the container storage area which is located at the western edge of the facilities parking lot inside the security fence,
2) the waste oil storage tank located in a concrete pipe chase between the testing buildings west of Averill Avenue, and
3) the waste gasoline underground storage tank which is located at the north entrance of the cafeteria entrance in the northwest corner of the tank farm.

The plant contact for all inquiries concerning the interim status storage area closure program is Ms. Susan Kelsey (313/257-6595).

2.2 Facility Description

2.2.1 Container Storage Area

The container storage area, which measures 19'-0" x 72'-6", was originally constructed in 1977-1978 to store flammable liquids and petroleum products. Hazardous wastes have been stored in this area since the completion of its construction in 1978 and has been operated under Part A interim status since 1980. The container storage area (see Figure 1) is made up of two distinct structures:

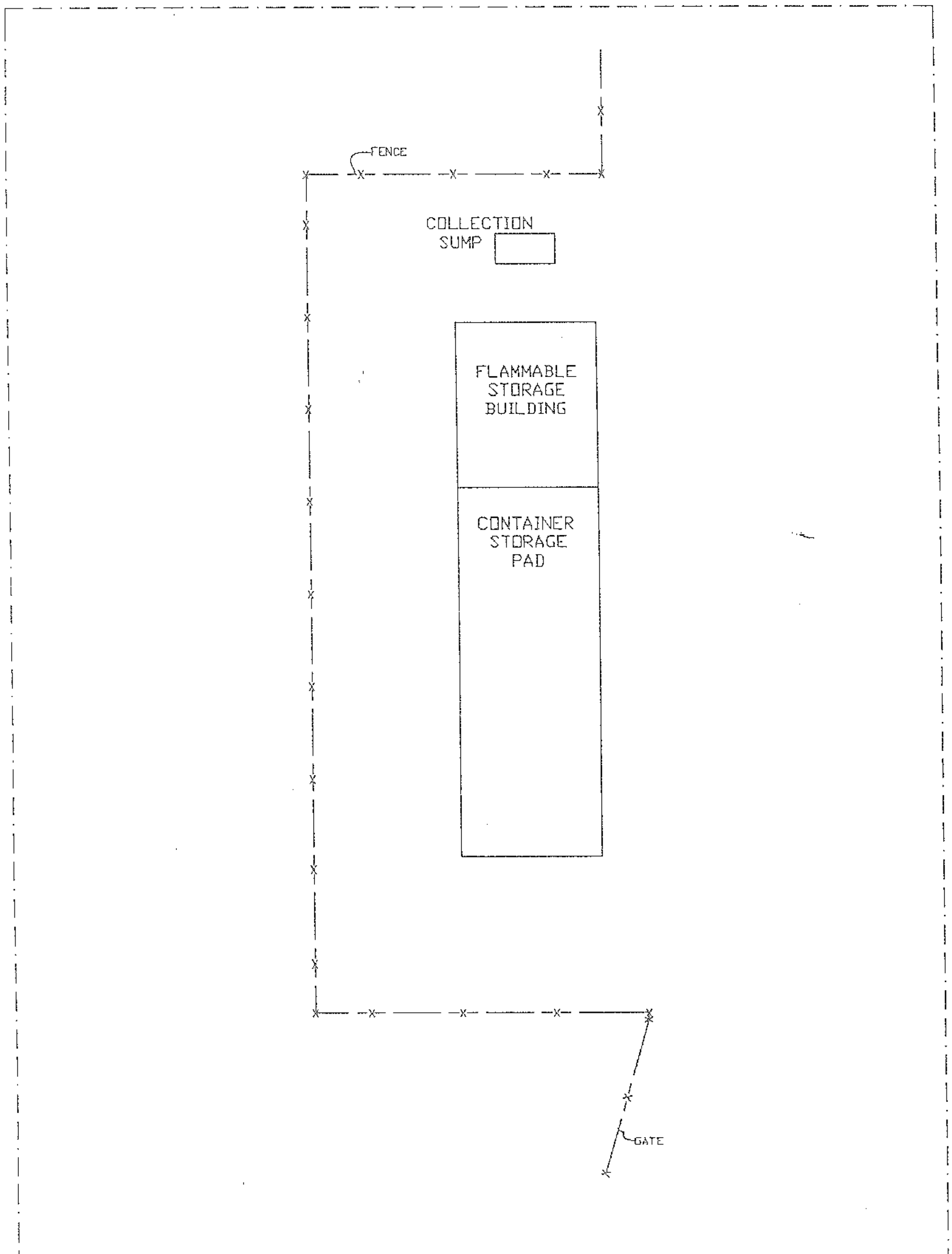
1) a totally enclosed building, designated as the flammable storage building, and

2) a fenced in storage area, adjacent to the building and is designated as the container storage pad.

The area to the east is paved, and the areas to the north, south, and west side of the container storage area are gravel surfaces over fill and native soils.

The flammable storage building (see Figure 2) is a totally enclosed, structural steel building (19'-0" x 22'-6") that has insulated metal siding and a metal roof. The floor slab is 6" reinforced concrete and is pitched to drain to a catch basin located in the center of the building. The building has a 4" high concrete containment curb around the perimeter. The entrance on the east side of the building is ramped to provide access into the building from the paved surface that extends from the ramp to traffic routes used to transport the materials to and from the flammable storage building. There is an emergency exit on the west side of the flammable storage building; this man door has not been used for the movement of waste materials.

Adjacent to the flammable storage building is the container storage pad (19'-0" x 50'-0") of which a 10'-0" x 30'-0" area was permitted for the storage of containerized hazardous wastes (see Figure 2). The container storage pad has a metal roof and a 20'-0" high exterior fence that extends from the floor to the bottom of the roof. The "privacy weave" of the fence minimizes the quantity of influent precipitation. The floor slab is 6" reinforced concrete and is pitched to drain into two catch basins located along the centerline of the container storage pad. The pad has a 4" high concrete containment curb around the perimeter. The entrance on the east side of the structure is ramped to provide access to the pad from the paved surface that extends from the ramp to traffic routes used to transport the materials to and from the container storage pad. There are two man-doors for emergency exists on the west side of the container storage pad; these are not used for the movement of waste materials.



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JOB NO. 207-8001

DATE: OCT. 14, 1988 | REV. Ø

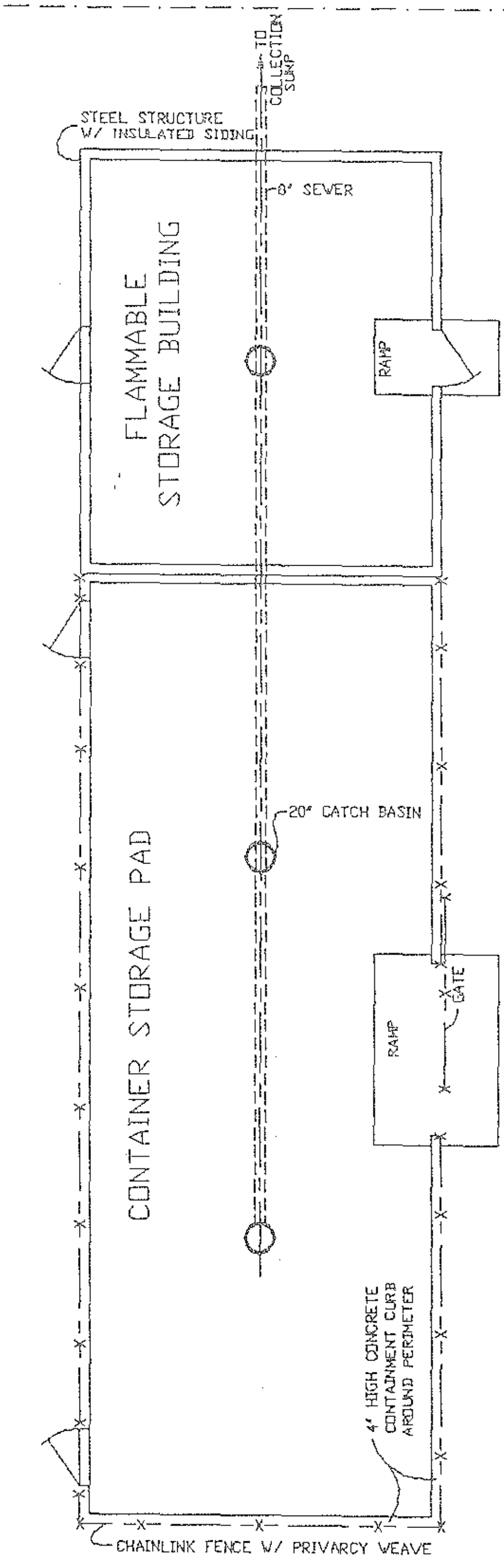
CONTAINER STORAGE AREA
SITE LOCATION PLAN

SCALE: 1"= 20'-0"

AC ROCHESTER DIVISION
GENERAL MOTORS CORP
ENGINEERING COMPLEX
MID980568620
1601 N. AVERILL AVE. FLINT MI 48556

N

FIGURE
1



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DATE: OCT. 14, 1988 | REV. Ø

CONTAINER STORAGE AREA

SCALE: 1"=10'-0"

AC ROCHESTER DIVISION
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MID980568620
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N

FIGURE 2

The catch basins for the container storage area drain through an 8" pipe to a 1000 gallon containment sump located eight (8) feet north of the storage area (see Figure 3). Any effluent collected in the sump is pumped to the AC wastewater treatment plant or placed in containers and properly disposed, based on the characteristics of the liquids.

2.2.2 Waste Oil Storage Tank

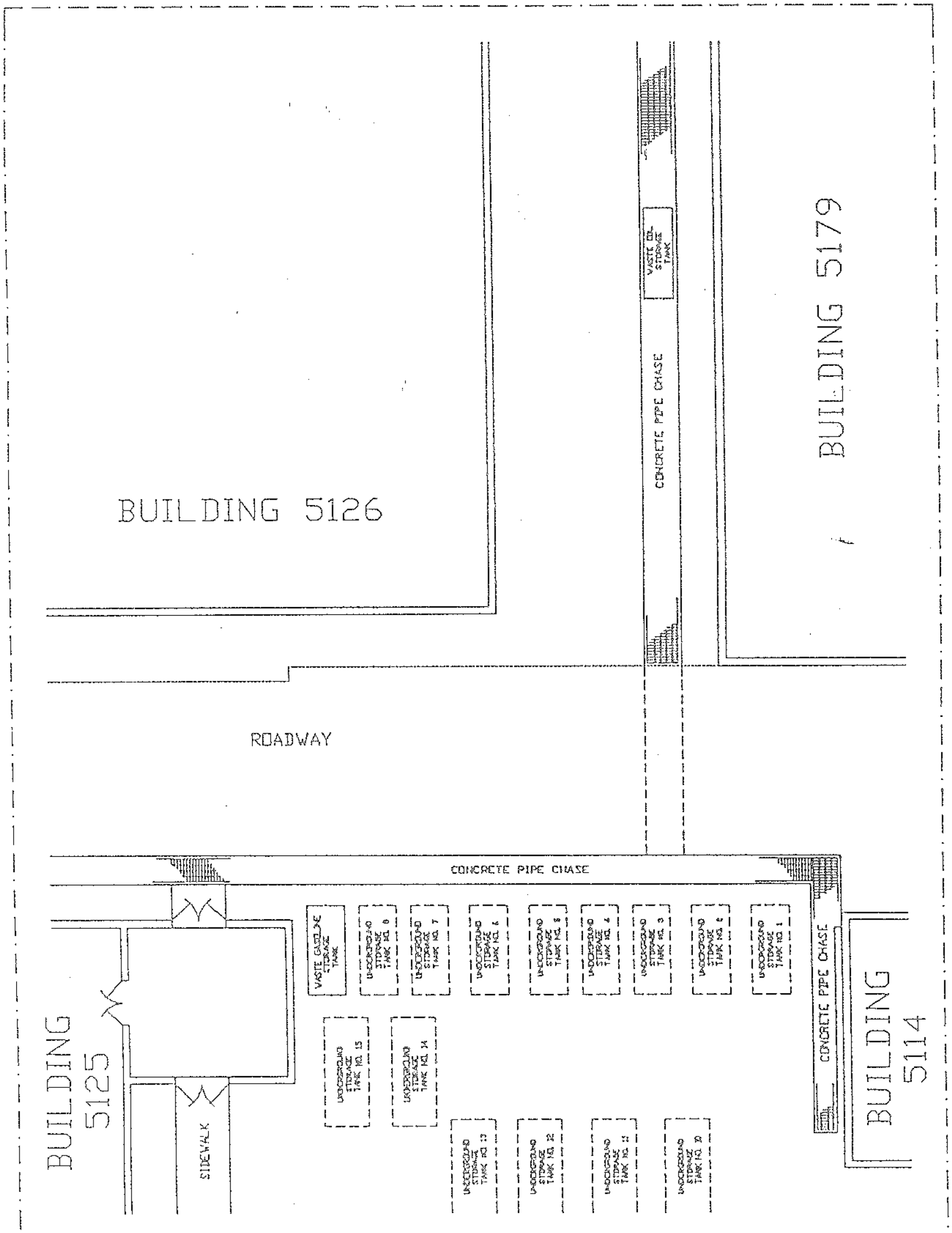
The 1000 gallon waste oil storage tank is located in a concrete pipe chase with metal grating above. This tank was installed in March 1987 as an upgrade of the original waste oil storage tank. The original tank is located between a large concrete pipe chase and an adjacent building and partially under each. Therefore, it was not possible to remove the tank or collect subsurface soil samples. Since there has never been any evidence of discharges from this tank, and since its removal would damage the adjoining building's foundation, it was closed in place.

The replacement tank (a subject of this closure plan) installed in a secondary containment vault, the adjoining concrete pipe chase, which is fully accessible for inspection and monitoring as an upgrade to the existing tank. The existing tank was thoroughly cleaned, filled with light concrete, and capped with concrete. All wastes are transferred to the new tank via enclosed piping (see Figure 3). Information pertinent to the closure of the original tank is presented in Appendix A.

2.2.3 Waste Gasoline Underground Storage Tank

The existing waste gasoline tank is located in the northwest corner of the facility's tank farm (see Figure 3). It was installed in December 1983 (upgrade of original tank) and was leak tested on January 12, 1988. The tank was found to have no leaks and no spills or leaks have ever been associated with past use of this tank. This tank receives waste gasoline that is generated when the fuel lines of the test engines are purged. All wastes are transferred to the tank via enclosed piping.

This tank is the only waste storage tank among the twenty-three tanks located in the tank farm. The other tanks are used to store a variety of materials, including benzene, diesel fuel, gasoline, and indolene.



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DATE: OCT. 14, 1988 | REV. Ø

WASTE STORAGE TANKS
SITE LOCATION PLAN

SCALE: 1" = 20'-0"

AC ROCHESTER DIVISION
GENERAL MOTORS CORP
ENGINEERING COMPLEX
MID980568620
1601 N. AVERILL AVE. FLINT MI 48556

FIGURE 3

This tank farm is an active Group 1, Michigan Public Act 307 Site as a result of a leaking underground storage tank that was used to store benzene. The AC Rochester Division, with full cooperation of the Michigan Department of Natural Resources is currently remediating this site. The leaking tank and the surrounding contaminated soils have been removed and properly disposed. The uppermost contaminated saturated zone is being remediated. Ground water is being removed through down-gradient purge wells and recovered into on-site containers. The contaminated ground water is then discharged to the AC wastewater treatment facility which can properly treat it prior to ultimate discharge into the City of Flint sanitary sewer system. Information pertinent to these activities is included in Appendix B.

2.3 Waste Storage

Information contained in the Engineering Complex's 1985 and 1987 Biennial Reports provides the primary basis for evaluating the types and quantities of wastes managed in the facility in the recent past. A summary of this data is presented in Table 1.

All wastes, except the bulk waste oil and the waste gasoline, have been contained in sealed steel drums or smaller containers and stored at the container storage area. The waste oil and the waste gasoline are both piped directly into the appropriate storage tank from the point of generation. There are no records of serious spills, leaks or other releases of hazardous wastes having occurred from any of the hazardous management units.

The data in Table 1 indicate that a variety of listed and characteristic wastes have been stored at the Engineering Complex. However, if the compositions of all the waste materials are examined (Table 2), it is evident that the potential hazardous constituents are limited to volatile solvents and lead.

2.4 Waste Management During Closure

Once closure activities have been initiated, all hazardous wastes will be managed in accordance with Michigan Act 64 rules (R 299.9306) requirements for storage of hazardous wastes for less than 90 days by generators of more than 1000 kg of hazardous wastes per month. All wastes in storage at the time of closure will be transferred to disposal or temporary storage. Materials

TABLE 1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	YEARLY QUANTITIES (REPORTED IN POUNDS) 1985	1986	1987	TOTAL
D001	Waste Solvent - Hydrocarbon			1,485	1,485
D001	Waste Gasoline		13,260	40,500	53,760
D008	Waste Oil	41,822		46,100	87,922
F002	Waste Halogenated Solvents			5,368	5,368

TABLE 2

HAZARDOUS COMPONENT SUMMARY AND CHEMICAL ANALYSIS STRATEGY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	HAZARDOUS WASTE COMPONENT	ANALYSIS METHOD **
D001	Waste Solvent - Hydrocarbon	Volatile Aromatic Hydrocarbons	8020 or 8240
D001	Waste Gasoline	Volatile Aromatic Hydrocarbons and Lead	8020 or 8240 7420
D008	Waste Oil	Lead	7420
F002	Waste Halogenated Solvents	Volatile Chlorinated Hydrocarbons	8010 or 8240

** - United States Environmental Protection Agency
Test Methods for Evaluating Solid Wastes (SW-846)

transferred to temporary storage will be transported for disposal within 90 days of their respective accumulation start dates.

2.4.1 Waste Management During Closure of Container Storage Area

Prior to initiation of the closure program, all materials currently stored in the container storage area will be transported to disposal or moved to modular steel storage structures that are commercially available and designed for storing hazardous materials. An appropriate number of structures will be used to properly segregate the wastes. These structures will be erected on the adjoining pavement to prevent contamination of surrounding soils. These modular steel storage units will be used as a temporary hazardous waste accumulation area until the closure is completed. This temporary area meets the requirements (40 CFR 262.34) for accumulation of hazardous wastes for less than 90 day by generators.

Plant hazardous waste management operations are being modified to ensure that wastes accumulated at the temporary facility will not be accumulated longer than 90 days. After closure of the current storage area, future hazardous waste accumulation activities will be returned to this area. Future waste management activities will be conducted according to the requirements for generators of more than 1000 kg of hazardous wastes per month.

2.4.2 Waste Management During Closure of Waste Storage Tanks

In order to continue safe operations at the Engineering Complex, the hazardous waste storage tanks can only be taken out of service for short periods of time; therefore, the storage tanks will be taken out of service for only the time required to inspect and clean each tank. Since all tanks have been assessed and certified for use in accordance with 40 CFR 265.191 (Appendices B and C), they will be returned to service immediately after decontamination. During the period of time the tank is out of service, wastes generated will be accumulated in containers and managed at the temporary container storage area as described in Section 2.4.1.

The waste oil storage tank will be temporarily taken out of service, all materials will be removed, and the tank will be cleaned as described in Section 4.4. Once the waste oil storage tank has been cleaned and inspected, it will be placed back into service for the remainder of the closure program. Future waste management activities will be conducted according to the requirements (40 CFR 262.34) for generators of more than 1000 kg of hazardous wastes per month.

The waste gasoline underground storage tank will be temporarily taken out of service, will have all liquids removed, and will be cleaned as described in Section 4.5. Once the waste gasoline underground storage tank has been cleaned and inspected, the tank will be placed back into service for the remainder of the closure program. Future waste management activities will be conducted according to the requirements (40 CFR 262.34) for generators of more than 1000 kg of hazardous wastes per month.

3.0 CLOSURE STRATEGY

A strategy has been developed for closure of each of the AC Rochester Division, Engineering Complex interim status hazardous waste storage areas. These strategies, presented below, provide the basis for design and implementation of the specific closure tasks described in Sections 4.0 through 7.0.

Closure of the Engineering Complex hazardous waste storage units has been specified in a manner that meets the following criteria in 40 CFR 265.111:

- minimizes the need for further maintenance,
- controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere, and
- complies with the applicable closure requirements of 40 CFR Subpart G.

This performance standard will be accomplished by 1) proper management and disposal of the remaining hazardous waste inventory, 2) decontamination of waste handling facilities and equipment, 3) an environmental sampling and analysis program to determine the potential impact of waste management activities, and 4) remediation as necessary to remove contaminated media and/or control the migration and impact of contaminants.

3.1 Closure Strategy for Flammable Storage Building

The flammable storage building was constructed for storing small containers (1 pint to 55 gallons) of flammable liquids. Although the flammable storage building was not intended to be included in the original Part A permit application, no historical data clearly shows that this building was not used for storage of hazardous wastes for greater than 90 days; therefore, this building will be included in the closure plan.

The first step in closing this building will be to thoroughly clean the interior of the structure as described in Section 4.1. Then the soils around the unpaved perimeter of the structure will be sampled and analyzed (see Figure 4). This strategy was selected because the flammable storage building is totally enclosed, the building is structurally sound, and there is no visible evidence of contamination from waste management activities. The four background samples as described in Section 5.3 will be used for determining if contamination has occurred.

3.2 Closure Strategy for Container Storage Pad

The container storage pad is adjacent to the flammable storage building and is enclosed with a fence that employs a "privacy weave" to minimize the quantity of influent precipitation.

The first step in closing this container storage pad will be to thoroughly clean the concrete pad surface as described in Section 4.2. The perimeter soils and the soils beneath the pad will be sampled and analyzed as described in Sections 5.1 and 5.2. (see Figure 4 and Figure 5). This strategy was selected because the container storage pad is structurally sound, and there is no visible evidence of contamination from waste management activities. The sampling points are located where contamination of the soil is most likely to be found. Samples of the perimeter soils will be collected where the soils are not covered with impervious pavement. The soils beneath the pad will be sampled at the low point within the containment area, which is adjacent to the northern catch basin. The four background samples as described in Section 5.3 will be used for determining if contamination has occurred.

Once the cleaning and sampling have been completed in the container storage pad, the holes cored in the base slab will be filled with a non-shrink concrete grout.

3.3 Closure Strategy for Container Storage Area Drainage System

The container storage area drainage system collects all liquids resulting from spills, leaks and washing of the pad in the flammable storage building and container storage pad.

The strategy for closing the drainage system will be to thoroughly clean the catch basins, pipes, and the concrete collection sump as described in Section 4.3. Then the soils adjacent to the collection sump will be sampled as described in Section 5.2 (see Figure 4). The soil samples will be taken adjacent to the collection sump, the most likely area of contamination. The four background samples as described in Section 5.3 will be used for determining if contamination has occurred.

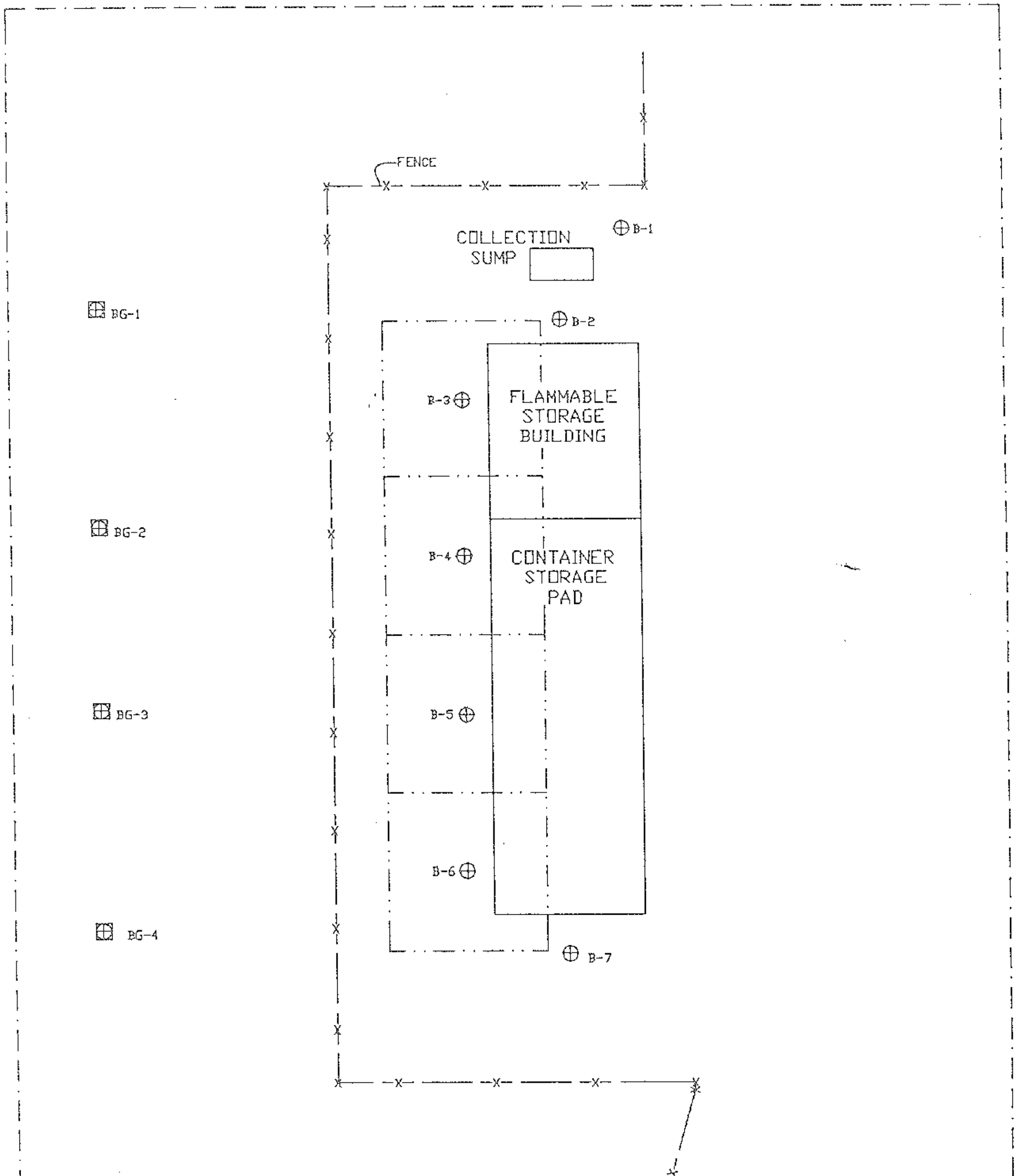
3.4 Closure Strategy for Waste Oil Storage Tank

The strategy for closing the waste oil storage tank (AC Tank # 5024) will be to first clean the tank as described in Section 4.4, then thoroughly examine it for deterioration and leaks. If the visual inspection shows that the tank is not leaking, the tank will be put back into service throughout the remainder of the closure activities. Should the visual inspection of the tank reveal that it may be leaking, the tank will be pressure tested. If the tank fails the leak test, the tank will be repaired if practical; otherwise it will be replaced. This tank was tested and certified for use in January 1988 in accordance with the requirements of 40 CFR 265.191; documentation of this certification is presented in Appendix C.

If any visual contamination is found in the concrete pipe chase in which the waste oil storage tank is contained, it will be thoroughly cleaned with a water/detergent solution using a high pressure spin blaster, then triple rinsed. All cleaning and rinsing solutions will be retained and managed as described in Section 4.6.

A soil boring will be made, as described in Section 5.4, directly west of the concrete pipe chase in which the waste oil storage tank is contained. This is the only practical place to collect samples because of equipment access restrictions. Drilling equipment cannot access the space east of the chase, and activities in the chase are prevented by safety considerations (flammable fuel pipes and tanks). Four background samples will be taken in the area between the test buildings as described in Section 5.5 (see Figure 6). The soil samples will be analyzed to determine if waste management practices during the interim status period have resulted in significant contamination of the underlying soils.

This strategy was selected because the waste oil storage tank can only be taken out of service temporarily in order to continue efficient plant operations. Furthermore, the tank is located in a secondary containment vault which is fully accessible for inspection and monitoring.



KEY:

⊕ - SAMPLE LOCATION

⊞ - BACKGROUND SAMPLE

— · · — SAMPLE GRID

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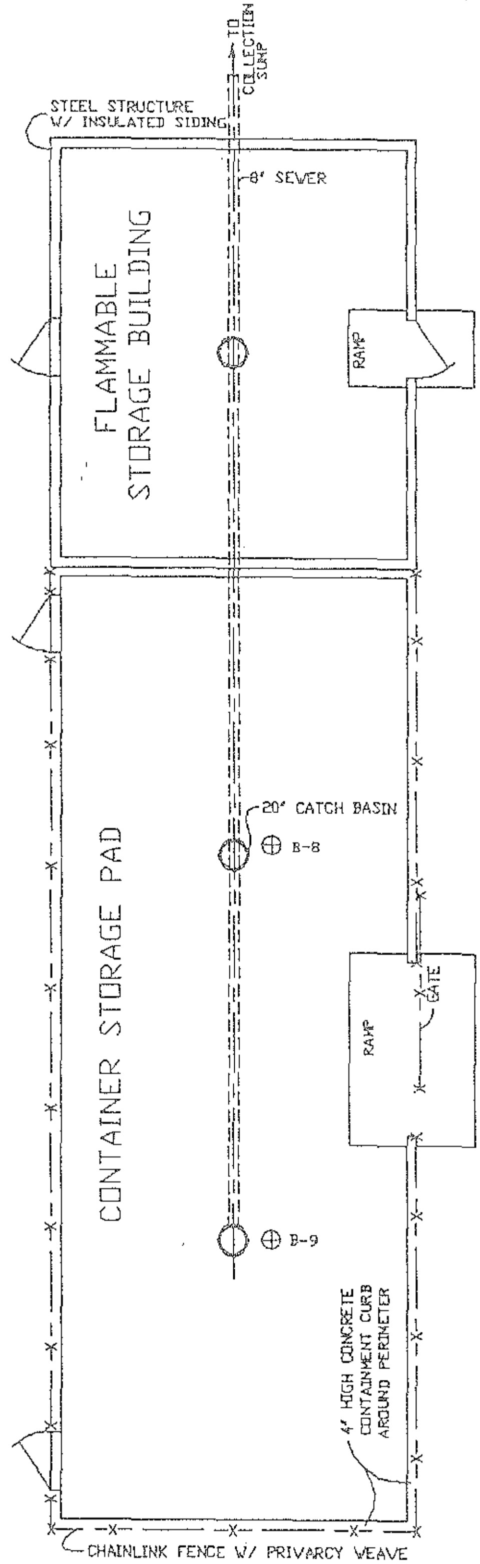
CONTAINER STORAGE AREA
SAMPLE LOCATIONS

SCALE: 1"= 20'-0"

AC ROCHESTER DIVISION
GENERAL MOTORS CORP
ENGINEERING COMPLEX
MID980568620
1601 N. AVERILL AVE. FLINT MI 48556

N

FIGURE 4



KEY:

⊕ - SAMPLE LOCATION

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JOB NO. 207-8001

DATE:

REV.

CONTAINER STORAGE PAD
SAMPLE LOCATION PLAN

SCALE: 1"=10'-0"

AC ROCHESTER DIVISION
GENERAL MOTORS CORP
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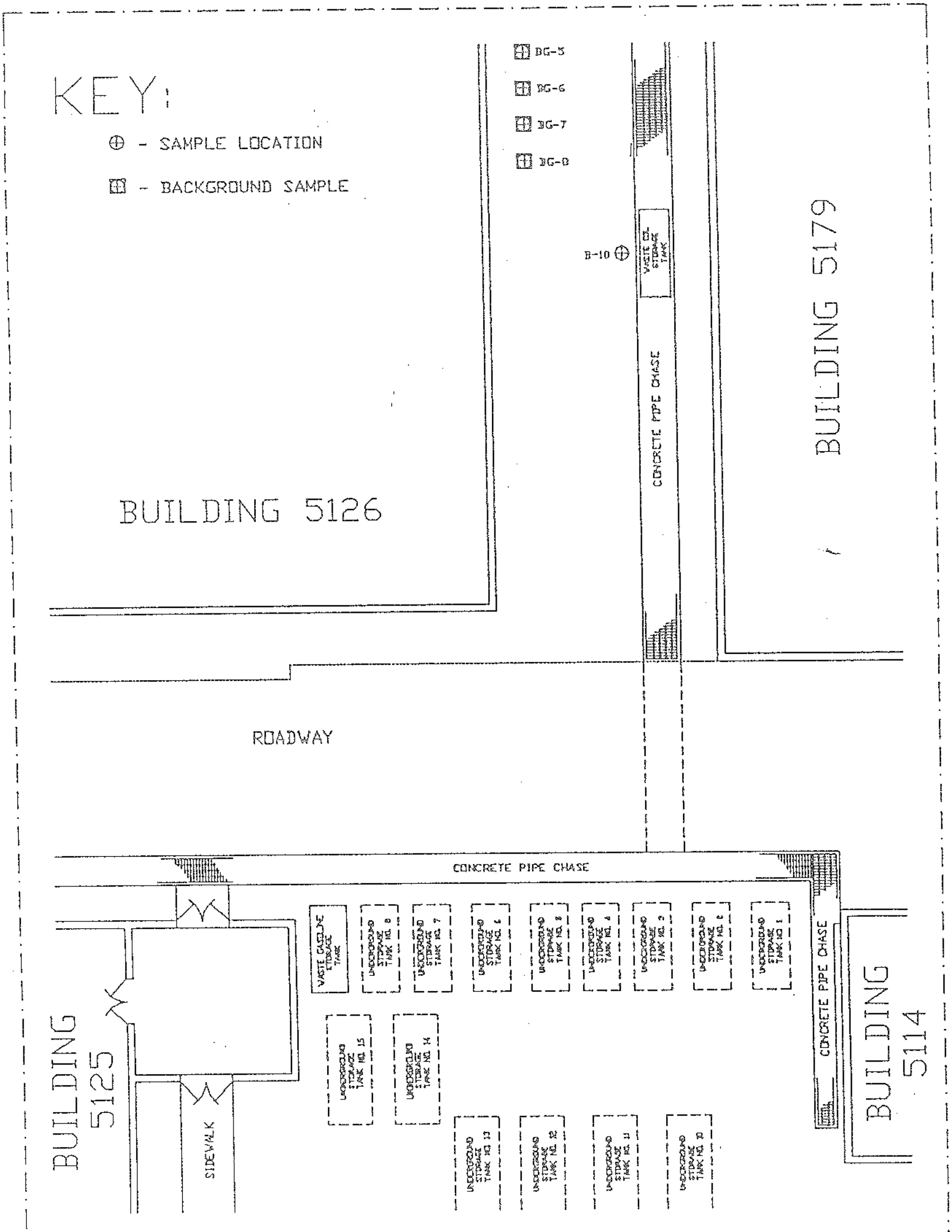
1601 N. AVERILL AVE. FLINT MI 48556

N

FIGURE 5



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DATE: OCT. 14, 1988 | REV. Ø

WASTE OIL STORAGE TANK SAMPLING POINTS

SCALE: 1"= 20'-0"

AC ROCHESTER DIVISION
GENERAL MOTORS CORP
ENGINEERING COMPLEX
MID980568620
1601 N. AVERILL AVE. FLINT MI 48556

N

FIGURE 6

3.5 Closure Strategy for Waste Gasoline Storage Tank

The strategy for closing the waste gasoline underground storage tank will be to thoroughly clean the tank as described in Section 4.5. After the tank has been thoroughly cleaned, it will be put back into service throughout the remainder of the closure activities.

This strategy was selected because the waste gasoline underground storage tank can only be taken out of service for short periods of time in order to continue safe plant operations. This tank was tested and certified for use in January 1988 in accordance with the requirements of 40 CFR 265.191; documentation of this certification is presented in Appendix C.

Soil sampling at the waste gasoline underground storage tank has not been included in this closure plan because the tank is located in a tank farm containing approximately twenty (20) other tanks (see Figure 3 for a partial site plan). The proximity of the other tanks, associated piping, buildings and other structures makes it virtually impossible to safely collect subsurface soils samples.

Furthermore, the tank farm is an active Group 1, Michigan Public Act 307 Site (see Appendix B for pertinent information) as a result of a leaking underground storage tank that was used to store benzene. The benzene contamination will interfere with sampling and analysis activities around the waste gasoline storage tank. A groundwater remediation program has been implemented at the site to collect and treat all contaminated groundwater arising from the area of the fuel farm. Soils excavation is not feasible in this area due to the presence of multiple USTs containing flammable liquids and multiple structures whose integrity would be placed at risk by soil removal. Any contamination of the underlying groundwater as a result of waste management practices during the interim status period will be remediated as part of the current site remediation.

4.0 INITIAL DECONTAMINATION PROCEDURES

4.1 Flammable Storage Building

The concrete floor slab and lower wall surfaces of the flammable storage building will be cleaned with a water/alkaline, non-phosphate detergent (All-Chem #502-GX or similar) solution using a high pressure spin blaster. After cleaning, all of the areas will be triple rinsed with water. All cleaning and rinsing solutions will be collected in the collection sump, then retained and managed as described in Section 4.6.

4.2 Container Storage Pad

The surface of the concrete container storage pad will be cleaned with a water/alkaline, non-phosphate detergent (All-Chem #502-GX or similar) solution using a high pressure spin blaster. After cleaning, all of the areas will be triple rinsed with water. All cleaning and rinsing solutions will be collected in the collection sump, then retained and managed as described in Section 4.6.

4.3 Container Storage Area Drainage System

The container storage area drainage system and collection sump will be cleaned with a water/alkaline, non-phosphate detergent (All-Chem #502-GX or similar) solution using a high pressure spin blaster and a sewer jet. After cleaning, all of the areas will be triple rinsed with water. All cleaning and rinsing solutions will be collected in the collection sump, then retained and managed as described in Section 4.6.

4.4 Waste Oil Storage Tanks

In order to continue safe plant operations, the waste oil storage tank will only temporarily be taken out of service during closure. All liquids in the waste oil storage tank will be pumped into a tank truck for transportation to recycling, and all sludges will be removed to disposal. The waste oil storage tank will then be thoroughly cleaned with a water/alkaline, non-phosphate detergent (All-Chem #502-GX or similar) detergent solution using a high pressure spin blaster. Accessible associated piping will be similarly cleaned using a high pressure, water-blast wand. After cleaning, it will be triple rinsed with water. The secondary containment trench surfaces at the tank and ten (10) feet each side of the tank will also be washed and rinsed as described above. All cleaning and rinsing solutions will be retained and managed as described in Section 4.6.

4.5 Waste Gasoline Underground Storage Tank

In order to continue safe plant operations, the waste gasoline underground storage tank will only temporarily be taken out of service during closure. All liquids in the waste gasoline underground storage tank will be pumped into a tank truck for transportation to recycling, and all sludges will be removed to disposal. The waste gasoline underground storage tank will then be thoroughly cleaned with a water/alkaline, non-phosphate detergent (All-Chem #502-GX or similar) solution using a high pressure spin blaster. After cleaning, all of the areas will be triple rinsed with water. All cleaning and rinsing solutions will be retained and managed as described in Section 4.6.

4.6 Management of Decontamination Rinsates

All waste aqueous and solvent liquids from decontamination of the storage pad and sampling equipment will initially be collected in drums, vacuum tankers, holding tanks or other appropriate containers on-site. These materials will then be chemically analyzed to determine if they are compatible with the plant's wastewater treatment facility. If compatible, they will be sent to the AC wastewater treatment facility for proper treatment prior to ultimate discharge into the City of Flint sanitary sewer system. If incompatible, they will be properly managed and disposed in accordance with applicable state and federal regulations.

The AC wastewater treatment facility is permitted to discharge under the Metal Finishing, Porcelain Enameling, Electrical and Electronic Components, and Plastic Molding Pretreatment Standards. The determination of applicability for wastewater treatment of closure waste liquids will be based on the wastewater discharge limits currently in effect for the facility. The maximum adjusted discharge limits currently in effect for the plant are listed in Table 3.

Based on wastewater treatment efficiencies and dilution factors at the AC wastewater treatment facility, the acceptance criteria for closure liquids will be as shown in Table 3. These criteria result from the treatment plant's ability to chemically and physically remove the contaminants of concern in one or more of the plant's following processes: acid/base neutralization, metals precipitation, air oxidation, and hypochlorite oxidation.

Analyses of the closure liquid samples for total toxic organics and lead will be performed using the analysis methods specified in Table 4. If concentrations of all analytes are below the treatment plant acceptance criteria shown in Table 3, then the closure liquid will be sent to the AC wastewater treatment facility for processing. If the acceptance criteria are exceeded, the wastes will be transported and disposed at a licensed wastewater disposal facility. If chemical analysis data (Method 1310, SW-846) results in characterization as hazardous waste, the wash waters will be managed according to Michigan Act 64; otherwise, the will be managed in accordance with Michigan Act 136 rules.

TABLE 3
AC ROCHESTER DIVISION, WASTEWATER TREATMENT FACILITY
ACCEPTANCE CRITERIA AND EFFLUENT DISCHARGE LIMITS

ANALYTE	ACCEPTANCE CRITERIA	EFFLUENT DISCHARGE LIMIT
Lead	63.0 mg/l	0.63 mg/l
Total Toxic Organics	19.5 mg/l	1.95 mg/l

5.0 SAMPLING AND ANALYSIS PLAN

The site assessment program to support clean closure of the storage areas will begin after conclusion of the decontamination procedures described in Section 4.0 above. It will be comprised of sampling and analysis activities for the following four areas:

1) soils beneath the container storage pad,

2) soils on the north, south, and west sides of the container storage area,

3) soils adjacent to the collection sump,

4) soils adjacent to the concrete pipe chase that contains the waste oil storage tank.

Descriptions of the sampling protocols that will be used for each of these areas are presented in the following subsections. Descriptions of the chemical analysis procedures for collected samples are presented in Section 5.8.

5.1 Soils Beneath the Container Storage Pad

The concrete slab adjacent to the catch basins will be cored and the borings will be extended through the slab to collect subsurface soil samples in the two locations shown in Figure 5. The locations of sampling points have been chosen at the low point in the containment slab. Subsurface soil samples will be analyzed to determine if hazardous waste constituents have permeated through the concrete.

After coring through the concrete slab at each sampling point, borings will be advanced using a hollow stem auger. Soil samples will be collected from beneath the storage pad utilizing split spoon samplers during the performance of standard penetration tests. Samples will be obtained at depths of 1', 3', 5', 7' and 10' below the bottom of the foundation or until the first confining layer or saturated zone is encountered. Soil characteristics will be logged during the drilling of each hole to define subsurface soil horizons.

The auger will be decontaminated by steam cleaning prior to the extension of each bore hole. The split spoon samplers will be steam cleaned and rinsed with methanol prior to collection of each sample. All liquid residues from decontamination activities will be collected in drums and managed as described in Section 4.7.

Soils samples collected from the 1', 3'and 5' depths in each boring will be analyzed initially. If contamination is observed in these soils, samples from subsequent depths will be analyzed to determine the vertical extent of contaminant migration. Subsurface soil samples will be chemically analyzed for the presence and concentration of the USEPA Volatile Organic Analytes and lead (Table 3). Based upon the compositions of wastes historically stored in the facility (Table 2), these are the potential contaminants that are reasonably expected to be present. Samples from depths below 5' will be analyzed for the contaminants of concern identified in the shallower samples.

5.2 Soils Surrounding the Container Storage Area

Seven soil borings (Figure 4) will be performed to collect subsurface samples from areas around the concrete pad that are not covered with an impervious surface. The locations for sampling points B-3 through B-7 were based on a sample grid of 20' as recommended by Michigan Department of Natural Resources ("How Clean is Clean") for areas less than 10,800 sq. ft. in size, the geometry of the container storage area, and the waste management practices during the interim status period. Sample points B-1 and B-2 were selected to evaluate soils in the vicinity of the container storage area drainage pipe and sump. Subsurface soil samples will be analyzed and compared with the background samples (see Section 5.3) to determine if the hazardous waste constituents exist at levels greater than background levels.

The borings will be advanced using a hollow stem auger. Soil samples will be collected utilizing split spoon samplers. Samples will be obtained at depths of 1', 3', 5', 7' and 10' below the ground surface or until the first confining layer or saturated zone is encountered. Soil characteristics will be logged during the drilling of each hole to define subsurface soil horizons.

The auger will be decontaminated by steam cleaning prior to the extension of each bore hole. The split spoon samplers will be steam cleaned and rinsed with methanol prior to collection of each sample. All liquid residues from decontamination activities will be collected in drums and managed as described in Section 4.6.

Soils samples collected from the 1', 3' and 5' depths in each boring will be analyzed initially. If contamination is observed in these soils, samples from subsequent depths will be analyzed to determine the vertical extent of migration. Subsurface soil samples will be chemically analyzed for the presence and concentration of the USEPA Volatile Organic Analytes and lead (Table 4). Based upon the compositions of wastes historically stored in the facility (Table 2), these are the potential contaminants that are reasonably expected to be present. Samples from depths below 5' will be analyzed for the contaminants of concern identified in the shallower samples.

5.3 Background Soils at the Container Storage Area

Four sets of background soil samples will be collected from an area lying out of traffic flow and west of the container storage area (see Figure 4). Four individual samples will be collected from each of the soil horizons identified during the collection of subsurface soil samples beneath the container storage area and surrounding the container storage area. Samples will be collected as described in Section 5.2 with split spoon samplers during the advancement of boreholes at each sample point. Each of the background samples will be chemically analyzed for the presence and concentration of lead (see Table 4).

5.4 Soils Adjacent to the Waste Oil Storage Tank

One soil boring will be performed to collect subsurface soil samples approximately 3' - 4' west of the concrete pipe chase containing the waste oil storage tank (see Figure 6). This is the only available sample point due to safety concerns and obstructions limiting equipment access to areas east of the chase. Soil boring activities in the concrete chase are not feasible because of the presence of numerous pipes carrying highly flammable fuels. Subsurface soil samples will be analyzed to determine if hazardous waste constituents have contaminated the soils surrounding the waste oil storage tank.

The borings will be advanced using a hollow stem auger. Soil samples will be collected utilizing split spoon samplers. Samples will be obtained at depths of 1', 3', and 5' below the bottom of the pipe chase or until the first confining layer or saturated zone is encountered. Soil characteristics will be logged during the drilling of the bore hole to define subsurface soil horizons.

The auger will be decontaminated by steam cleaning prior to the extension into the bore hole. The split spoon samplers will be steam cleaned and rinsed with methanol prior to collection of each sample. All liquid residues from decontamination activities will be collected in drums and managed as described in Section 4.6.

All soil samples collected from the bore hole will be chemically analyzed for the presence and concentration of lead (Table 4). Based upon the compositions of waste oils historically stored in the tank (Table 2), lead is the potential contaminant that is reasonably expected to be present.

5.5 Background Soils at the Waste Oil Storage Tank

Four sets of background soil samples will be collected from an area northwest of the waste oil storage tank (see Figure 6). Four individual samples will be collected from each of the soil horizons identified during the collection of subsurface soil sampling preformed adjacent to the concrete pipe chase that contains the waste oil storage tank. Samples will be collected as described in Section 5.4 with split spoon samplers during the advancement of boreholes at each sample point. Each of the background samples will be chemically analyzed for the presence and concentration of lead (see Table 4).

5.6 Decontamination of Sampling Equipment

All sample collection equipment will be decontaminated during sampling activities as described in the preceding sections. At the conclusion of the sampling programs, all sampling and drilling equipment will be decontaminated prior to removal from the site. Decontamination activities will be performed in an area west of the oil storage tank and in an area east of the container storage pad; the decontamination area will be established on paved surfaces where possible. The perimeter of the decontamination area will be defined with 4" x 4" timbers, and then the entire surface will be covered with polyethylene sheeting to form a waterproof reservoir. The size of the decontamination pit will be adjusted as appropriate for the equipment in use. Decontamination rinsates will be pumped from the pit into drums or totes for storage.

Sampling equipment and drilling augers will be steam cleaned. The drilling truck and other large equipment will be washed with water and steam cleaned as appropriate. Decontamination fluids will be retained and managed as described in Section 4.6.

5.7 Sample Management

Samples collected during this closure program will be preserved and managed according to standard USEPA SW-846 protocols. Soil samples destined for metals analyses will be collected in plastic bottles. Soils samples destined for volatile organics analyses will be collected in sealed glass jars fitted with Teflon-lined lids, and then stored at 4°C prior to analysis. Rinsate samples will be collected similarly to the soils samples, except that samples for volatile organic solvents analysis will be collected in 40cc VOA vials.

The sample handling and transportation will be documented with a chain-of-custody sheet that will be prepared by the team leader and will be signed by each person who takes custody of the sample until it is delivered to the laboratory for analysis. This protocol is equivalent to that used by the USEPA in its CERCLA programs. Samples will be delivered to the analytical laboratory within 24 hours of collection.

5.8 Chemical Analysis Procedures

Samples of subsurface soils will be analyzed for the Volatile Organic Analytes (VOA) and lead. Background soil samples will also be analyzed for the presence and concentration of the USEPA Volatile Organic Analytes (VOA) and lead. Based on historical data (Table 2), these are the analytes which are reasonably expected to be present in the waste materials handled at the storage facility.

Analyses of samples for lead will be performed using USEPA SW-846 Method 7420. Volatile Organic Analytes (VOA) analyses will be performed according to USEPA Methods 8010 and 8020 or Method 8240, the method will be selected once the sample has been taken. Volatile Organic Analytes (VOA) samples will be prepared according to Method 5030. A summary of the analytes, analysis methods, and method detection limits are presented in Table 4.

TABLE 4

SUMMARY OF ANALYTES, ANALYSIS METHODS AND METHOD DETECTION LIMITS

Analyte	SW-846 Method	Soils Method Detection Limit (mg/kg)
Priority Pollutant Volatile Organics		
Bromodichloromethane	8010	1.0
Bromoform	8010	2.0
Bromomethane	8010	2.0
Carbon tetrachloride	8010	1.0
Chlorobenzene	8010	1.0
Chloroethane	8010	5.0
2-Chloroethylvinyl ether	8010	1.0
Chloroform	8010	1.0
Chloromethane	8010	1.0
Dibromochloromethane	8010	1.0
1,2-Dichlorobenzene	8010	2.0
1,3-Dichlorobenzene	8010	2.0
1,4-Dichlorobenzene	8010	2.0
Dichlorodifluoromethane	8010	1.0
1,1-Dichloroethane	8010	1.0
1,2-Dichloroethane	8010	1.0
1,1-Dichloroethane	8010	1.0
trans-1,2-Dichloroethene	8010	1.0
1,2-Dichloropropane	8010	1.0
cis-1,3-Dichloropropene	8010	1.0
trans-1,3-Dichloropropene	8010	2.0
Methylene chloride	8010	1.0
1,1,2,2-Tetrachloroethane	8010	1.0
Tetrachloroethene	8010	1.0
1,1,1-Trichloroethane	8010	1.0
1,1,2-Trichloroethane	8010	1.0
Trichloroethene	8010	1.0
Trichlorofluoromethane	8010	1.0
Vinyl chloride	8010	2.0
Benzene	8020	2.0
Ethylbenzene	8020	2.0
Toluene	8020	2.0
Xylenes	8020	2.0

TABLE 4 (Cont.)
SUMMARY OF ANALYTES, ANALYSIS METHODS
AND METHOD DETECTION LIMITS

Analyte	SW-846 Method	Soils Method Detection Limit (mg/kg)	Wastewater Method Detection Limit (mg/l)
Total Toxic Organics			
Volatiles	8240		0.01 ea
Base-Neutral Extractables	8250/8270		0.01 ea
Acid Extractables	8250/8270		0.05 ea
Pesticides/PCBs	8080		0.001 ea
Michigan Act 64 Toxic Metal			
Lead	7420	5.0	0.05

Standard laboratory quality assurance procedures will be followed. These include instrument calibrations, method blanks, and sample spikes as necessary and appropriate. Furthermore, field blanks and blind duplicates, prepared in the field at the rate of approximately one per every ten samples collected, will be submitted to the laboratory for analysis.

5.9 Data Evaluation

Chemical analysis data for VOA and metals parameters will first be reviewed for accuracy and precision using quality assurance calibration and analysis data. The potential for soils contamination by metals will be determined using the Gossett Student's T-test at the 99% confidence level to compare background data to the suspect samples. Soils data will be compared with background data derived from at least four data points in the same soil horizon. The objective of this evaluation is to determine if waste management activities have contributed to any site contamination that may be discovered and measured. Any statistically significant increase of metals concentrations above background will indicate contamination from waste management activities, unless evidence of migration from off-site sources is discovered.

Contamination by volatile organics will be evaluated through review of soil and groundwater analysis results. The presence of volatile organic species at levels above demonstrated method detection limits will be indicative of the presence of contamination.

The goal of the AC Rochester is to achieve "clean closure" of the former drum storage area at the Engineering Complex. It is anticipated that the site investigation described in above will provide the necessary information to complete clean closure activities. However, if the results of this investigation indicate that contamination is present at levels statistically (Student's T-test or other approved statistical method) above background, additional investigations or remedial activities will be designed and conducted as described in Sections 6 and 7 following.

6.0 CONTINGENT SAMPLING AND ANALYSIS PLAN

If evidence of contamination at greater than background levels is found in any of the perimeter soil borings described in Section 5.0, additional sampling and analysis activities will be designed and implemented. These additional activities will be directed toward further investigation and determination of the extent of contamination.

If contamination is detected in peripheral soils, a sampling grid with sides of 20' in length will be established on each side of the pad where contamination was measured as recommended in Michigan Department of Natural Resources (MDNR) "How Clean is Clean" issued in March 1988. The initial sampling area will extend outward 20' from the pad edge and 20' beyond each end of the area of measured contamination. Samples will be collected from soil borings as described in Section 5.0.

If contamination is discovered in any of these subsequent grids, the grid system will be extended in 20' units in all directions (not previously sampled) from the contaminated unit. This process will be continued until background (metals) or non-detect (organics) levels of contaminants are reached.

Since the design of any additional assessment activities will be highly dependent on the data generated in the primary assessment, detailed descriptions of contingent programs are not feasible at the present time. Prior to implementation of additional sampling and analysis activities, a work plan will be developed and submitted to the Michigan Department of Natural Resources (MDNR) for approval.

7.0 CONTINGENT REMEDIAL ACTIVITIES

The goal of this program is to effect a clean closure of the waste storage area. If contaminated soils, stone or concrete are found in the areas investigated in the primary and/or contingent site assessment programs, the levels and extent of contamination will be evaluated to determine the most effective method of remediation. If relatively small areas of contamination are discovered, the contaminated soils will be excavated and disposed according to the guidelines published in "How Clean is Clean" (MDNR, May 1988), assuming that such excavation can be accomplished safely and without endangering proximate structures or plant operations. The area of excavation will be determined by the 20' grid interval established for sampling (20' diameter excavation circle centered on each contaminated sampling borehole), and the depth will be determined by the deepest point of contamination within each excavation area.

Contaminated soils, stone and concrete will be evaluated (40 CFR 261) to determine regulatory requirements for disposal. If the results of volatile organics analyses indicate that the soils or other disposed materials are contaminated by "listed wastes" they will be transported and disposed as hazardous wastes; if not, they will be managed as contaminated wastes. Soils containing metals at significantly elevated levels will be tested using the EP Toxicity procedure to determine if they are characteristically hazardous wastes. Other characteristic tests will be performed as required by the selected disposal site(s).

Excavated soils will be contained and transported to the disposal site(s) in lined and covered roll-off boxes and/or dump trailers. Materials will be transported by licensed waste transporters.

Excavated soils, stone and concrete will be disposed by treatment and/or landfilling as appropriate and acceptable based on the identities and concentrations of contaminants. If the soils are characteristically hazardous or hazardous by the mixture rule, they will be treated and/or disposed at a licensed hazardous waste disposal facility. Materials that are determined to be contaminated, but not hazardous wastes, will be disposed at a licensed Type II landfill.

After remediation, samples will be collected from each excavation area according to an appropriately sized grid system and analyzed for the contaminant(s) of concern to determine if all contaminated soils have been removed. The decision criteria described in Sections 5.9 will be used to evaluate the results. If contamination is found in any "clean check" sample, the excavation area around that sample location will be expanded. Excavation, sampling and analysis will continue until all contaminated soils are removed.

If the extent of contamination resulting from hazardous waste management activities or site/facility constraints preclude the practical or cost effective excavation of all contaminated soils, AC Rochester retains the option of exploring alternative remedial technologies. Numerous such technologies, such as *in situ* vitrification, on-site treatment/stabilization, *in situ* biodegradation, etc., have been successfully employed at RCRA and CERCLA sites nationwide; some have been demonstrated in Michigan. AC Rochester also retains the option of implementing partial closure with post closure monitoring (no clean closure). The selection of appropriate methodology will be dependent on data generated during the investigation and feasibility study phases of this closure program. If an alternative remedial technology is warranted, a revised remediation work plan will be prepared. It will be implemented only after MDNR review.

If contaminated structures are identified, they will be decontaminated in place as described in Section 4.0 if possible. Remediation equipment and smaller structural systems will be decontaminated at a decontamination area established as described in Section 5.6. Decontamination fluids will be managed as described in Section 4.6. Materials and equipment which cannot be effectively decontaminated will be characterized and disposed as described for soils above.

If it is determined that clean closure is not technically or economically feasible, then a closure/post closure maintenance and monitoring plan will be developed. It will be implemented only after MDNR review.

8.0 CLOSURE REPORT AND CERTIFICATION

At the conclusion of the clean closure program a report of activities and results, including owner and registered engineer certifications, will be prepared and submitted to the Michigan Department of Natural Resources (MDNR) within sixty (60) days after completion of closure activities. This report will contain the following applicable items:

- Certification statements by owner and registered professional engineer;
- Site assessment sampling and analysis procedures and results;
- Sampling location diagram;
- Technical and statistical evaluations of analysis data;
- Summary of closure activities including:
  - site and equipment decontamination,
  - location of disposal site(s),
  - site management activities,
  - field observations,
  - actual schedule;
- Copies of all waste shipment manifests;
- "Clean check" sampling and analysis procedures and results;
- Summary of site restoration activities and land use projections;
- Copies of approved closure plan and closure plan approval letter.

Closure activities will be monitored, inspected, and certified by an independent, registered professional engineer. Closure certification statements provided by the owner/operator and the independent registered engineer will be supplemented by the certification language provided in 40 CFR 270.11(d).

9.0 CLOSURE SCHEDULE AND COST ESTIMATE

9.1 Closure Schedule

The following estimated schedule has been developed for the closure of the Engineering Complex of the AC Rochester Division of General Motors hazardous waste storage areas:

ACTIVITY	DURATION
SITE ASSESSMENT	
Project mobilization	1-2 weeks
Site Decontamination	1-2 weeks
Site sampling	1-2 weeks
Chemical analyses	4-6 weeks
Data evaluation/reporting	2-3 weeks
CONTINGENT SITE ASSESSMENT	
To be determined as necessary	
CONTINGENT FEASIBILITY STUDY	
To be determined as necessary	
CONTINGENT REMEDIAL ACTIONS	
To be determined as necessary	

This schedule is highly susceptible to unforseen technical and site difficulties as well as effects of weather on projected activities.

The closure program will commence according to the above schedule immediately after receipt of the closure plan approval. The Waste Management division, Lansing District staff (517/322-1300) and Lansing Permits Section staff (517/373-2730) will be notified prior to starting closure activities at least five workdays prior to the initiation of any site activities.

9.2 Cost Estimate

The following cost estimates have been prepared for the various anticipated and contingent closure activities:

INITIAL SITE ASSESSMENT	
Pre-closure decontamination	$16,000.00
Soils sampling	$20,000.00
Chemical analyses	$28,000.00
Reporting and Certification	$ 8,000.00
TOTAL ESTIMATED COST:	$72,000.00

If initial closure assessment activities results indicate the need for additional assessment or remedial activities, cost estimates for these activities will be included in subsequent work plans submitted to the Michigan Department of Natural Resources (MDNR).

10.0 FINANCIAL ASSURANCE AND LIABILITY INSURANCE

General Motors Corporation guarantees the costs of closure for the interim status facility described in this closure plan in accordance with the requirements of 40 CFR 264 & 265, Subpart H and Michigan Public Act 64. A copy of the data submitted to the Michigan Department of Natural Resources in support of the use of the financial test to demonstrate financial responsibility is attached in Appendix E.

APPENDIX A

INFORMATION PERTINENT TO CLOSURE OF ORIGINAL WASTE OIL TANK

AC Rochester

1300 N. Dort Highway
Flint, Michigan 48556 USA

August 2, 1989

Subject: Abandonment - Engineering Bldg. Complex Waste Oil Tank

Upon routine monitoring for environmental concerns, it was discovered that the overflow for the 1000 gallon waste oil tank (#5070) was connected into the municipal storm sewer. It was immediately abandoned in place, due to an abundance of caution.

The tank never leaked and there was no evidence that it had ever overflowed. An attempt to leak test the tank was abandoned due to the physical restraints of the site and the knowledge that there was no desire to put the tank back into service and no reason to believe that the tank was leaking.

Due to the close proximity of the building footings, as it sits under both a concrete pipe chase (trench) and the building footings, the tank was temporarily abandoned in place. During May, 1986 the tank was permanently abandoned in place by cleaning it out and then filling with lightweight concrete. The manway cover was bolted back on and a concrete cap was formed on top of it. All associated piping was removed. The waste oil was disposed of at a licensed hazardous waste facility.

AC believes in properly engineering facilities so that potential for environmental damage is small and was therefore immediately willing to stop the use of the tank as a precautionary measure.

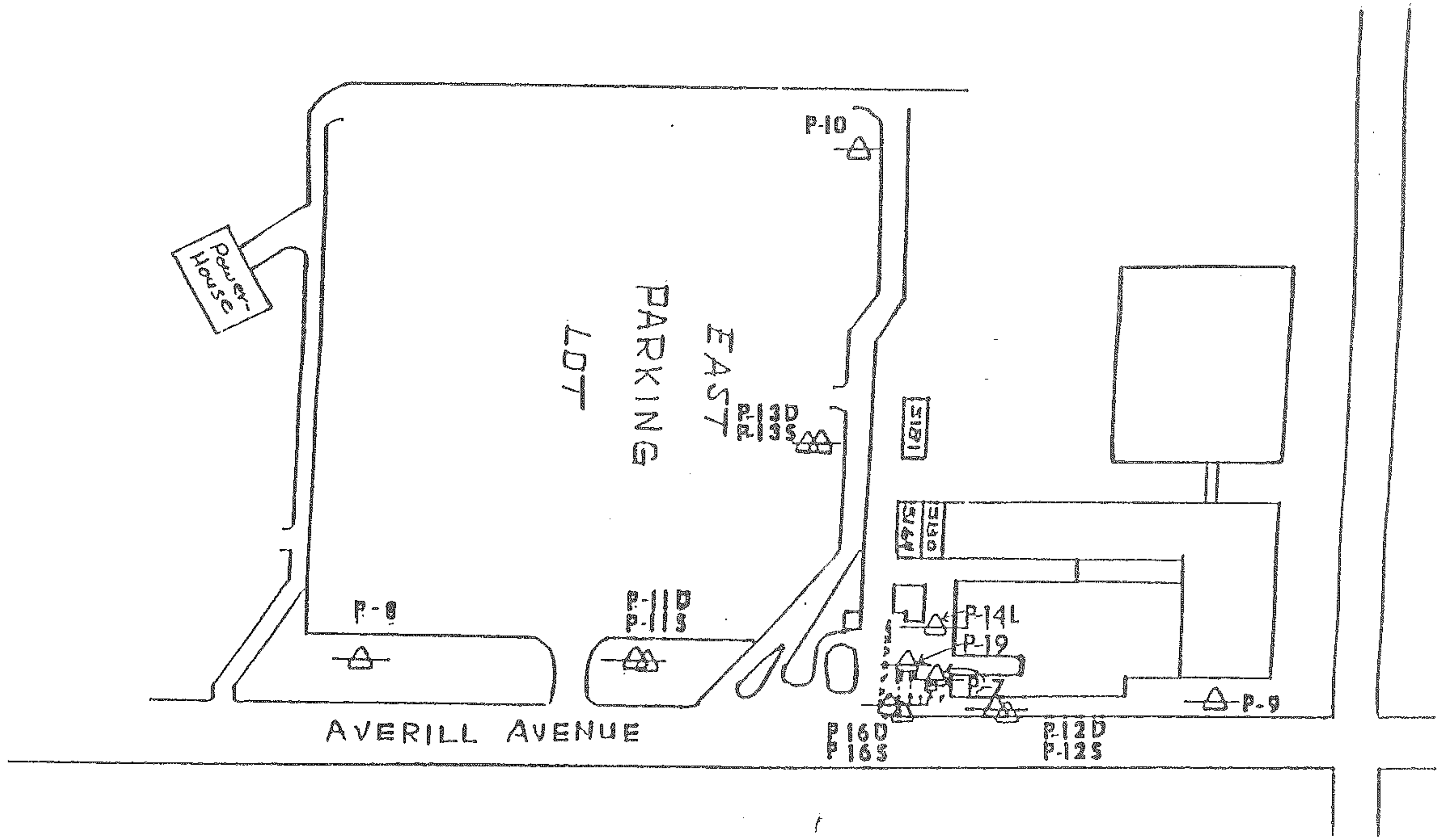
S. D. Kelsey

S. D. Kelsey
Sr. Environmental Engineer
Divisional Environmental Activities

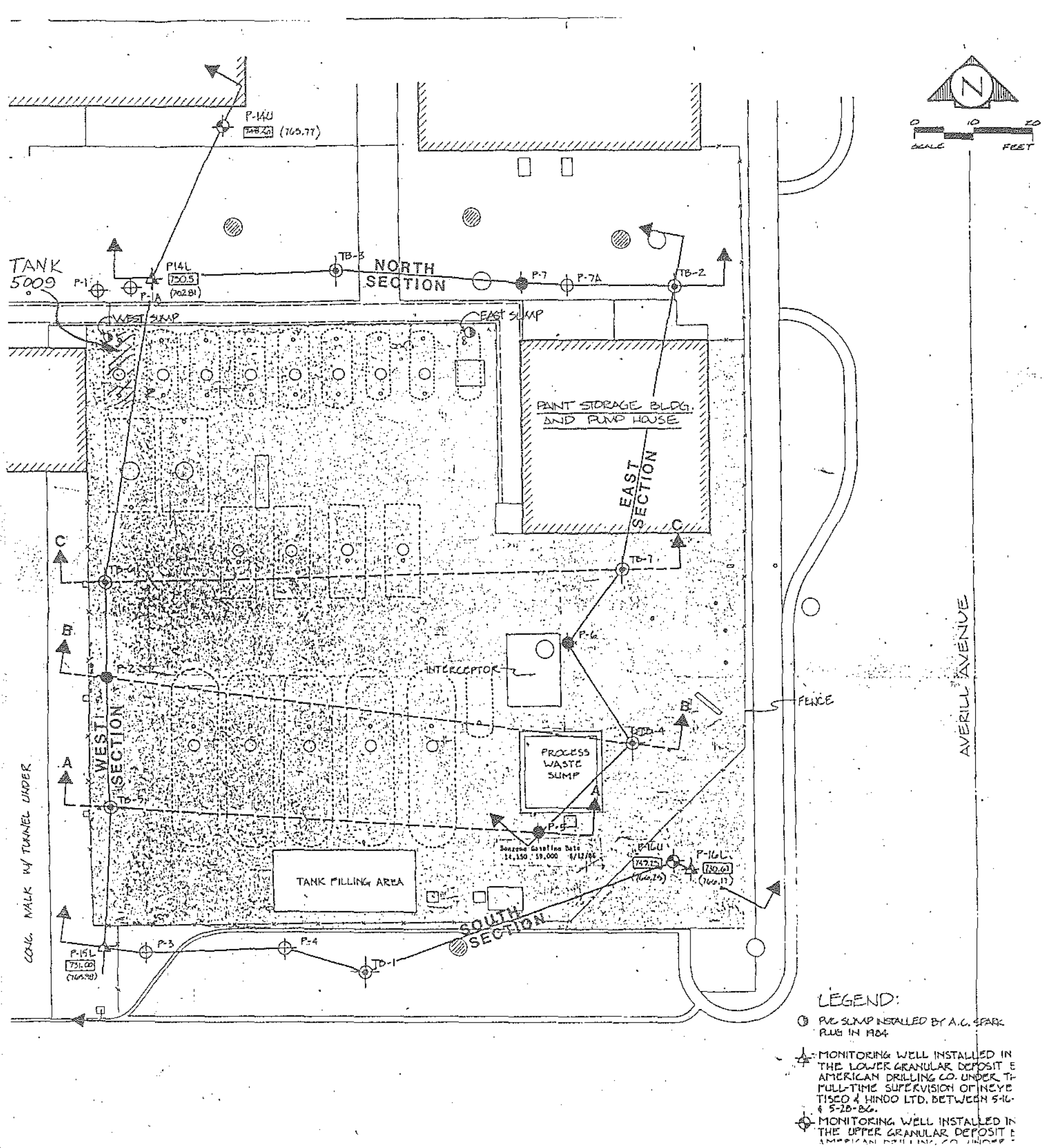
APPENDIX B

INFORMATION PERTINENT TO REMEDIATION AT FUEL FARM

Site Plans Showing Locations of
Borings and Monitoring Wells

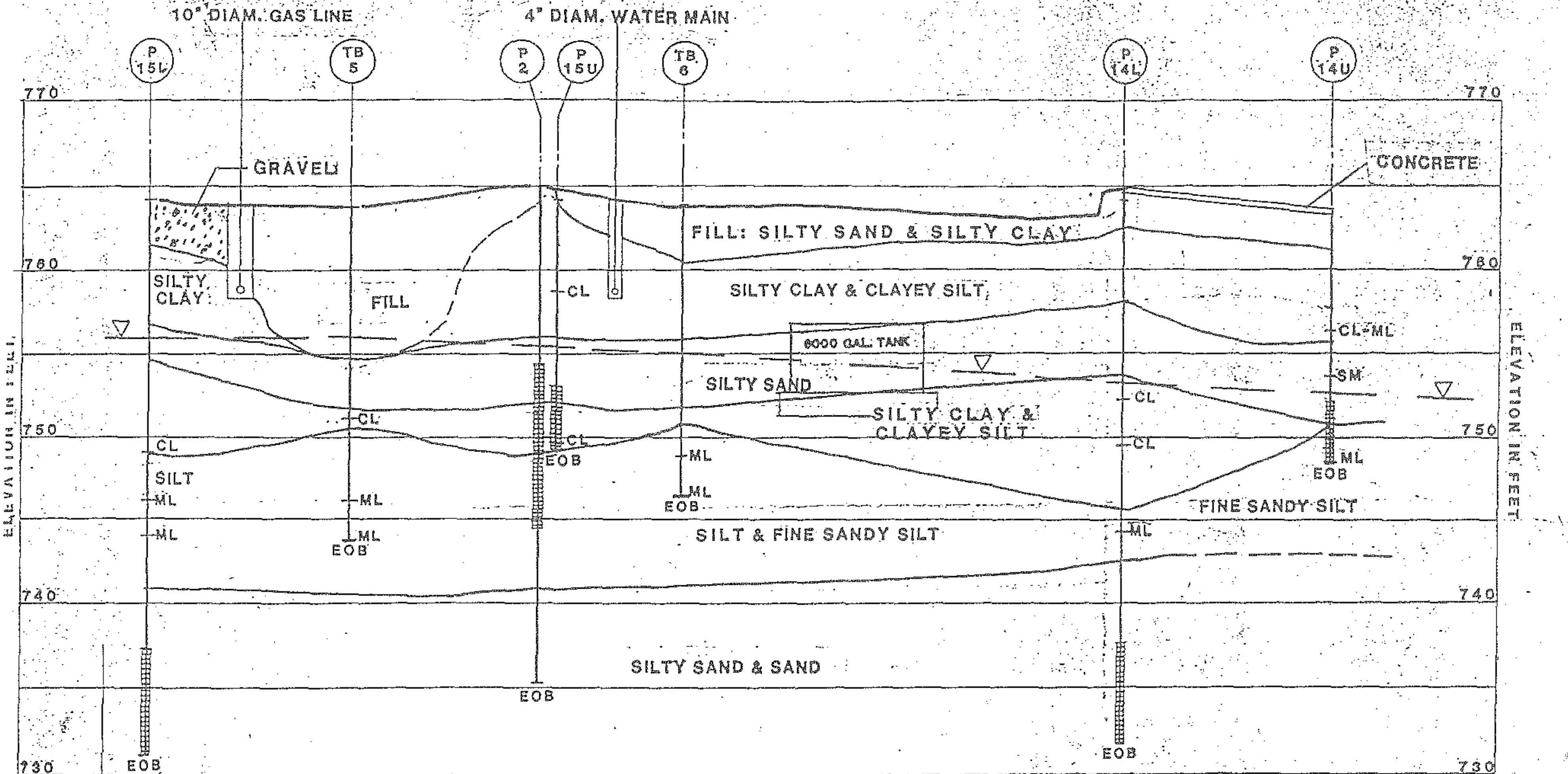


P-10
P-13D
P-13S
EAST
PARKING
LOT
Power-House
P-8
P-11D
P-11S
AVERILL AVENUE
P-16D
P-16S
P-14L
P-19
P-7
P-12D
P-12S
P-9



TANK 5009
P-14U
(765.77)
P14L
730.5
(702.81)
P-1
P-1A
TB-3
NORTH SECTION
P-7
P-7A
TB-2
WEST SUMP
EAST SUMP
PAINT STORAGE BLDG. AND PUMP HOUSE
EAST SECTION
C
TB-6
TB-7
B
P-2
P-6
INTERCEPTOR
FENCE
TB-4
A
WEST SECTION
TB-5
PROCESS WASTE SUMP
P-5
TANK FILLING AREA
P-16L
730.63
(766.17)
(766.25)
SOUTH SECTION
P-15L
731.00
(765.98)
P-3
P-4
TB-1
CONC. WALK W/ TUNNEL UNDER
AVERILL AVENUE
N
0 10 20
SCALE FEET
LEGEND:
PVC SUMP INSTALLED BY A.C. SPARK PLUG IN 1984
MONITORING WELL INSTALLED IN THE LOWER GRANULAR DEPOSIT B AMERICAN DRILLING CO. UNDER TH FULL-TIME SUPERVISION OF NEYE TISCO & HINDO LTD. BETWEEN 5-16- & 5-28-86.
MONITORING WELL INSTALLED IN THE UPPER GRANULAR DEPOSIT B

Soil Profile Section in
Area of Tank 5009 (Scrap Fuel)



WEST SECTION

Letter to MDNR
Concerning Fuel Farm Remediation Plan

AC Spark Plug

Division of General Motors Corporation Flint, Michigan 48556 USA

November 1, 1988

Certified Mail
Return Receipt Requested

Mr. Benjamin Hall
Environmental Response Division
Michigan Department of Natural Resources
P.O. Box 30028
Lansing, Michigan 48909

Dear Mr. Hall:

Per our meeting on October 6, 1988, this letter is to summarize the plan that was presented and accepted for the fuel farm groundwater remediation at AC Rochester Division (formerly AC Spark Plug).

Three main issues were discussed. They are the following:

1) The performance of the recovery in wells and sumps in the upper aquifer.
2) Remediation of the lower aquifer.
3) Treatment of the recovered groundwater.

The impact of the drought during the summer of 1988, on the rate of recovery from the wells in the upper granular unit, at the fuel farm was reviewed. This is a perched groundwater unit. The drought caused water levels in this aquifer to reach a four year low. For this reason it is no longer possible to pump continuously from the east and west sumps.

The following is the fuel farm groundwater remediation plan:

* Intermittent pumping from the east and west sumps as possible.
* Continuous pumping from well No. P-7.
* Continuous pumping from a new well to be located in the vicinity of pumps No. P-5 and No. P-6.
* Quarterly sampling of wells and analytical results to be sent to your office.
* Groundwater recovered from the wells will be discharged to the Engineering Building Complex, process wastewater system.

We will continue to monitor the performance of the remediation plan and will inform you of any important changes. We appreciate your cooperation in this remediation plan.

Very truly yours,

C. R. Wendel

Mr. C. R. Wendel
Chief Engineer
Wastewater Treatment Plant
Divisional Plant Engineering

bd

Fuel Farm Remediation Plan

REC'D
JUL 17 89
REC'D

NEYER, TISEO & HINDO, LTD.

Consulting Engineers and Geologists

REPORT ON FIELD INVESTIGATION - 1986/1987

PROJECT NO: 84043 AW

DESIGNATION: Remedial Action Plan - Pumping Option
Engineering Building Tank Farm
AC Spark Plug Manufacturing Facility

LOCATION: Flint, Michigan

CLIENT: General Motors Corporation
AC Spark Plug Division

DATE: June 22, 1987

S. Kelsey

NEYER, TISEO & HINDO, LTD.

Consulting Engineers and Geologists
38955 Hills Tech Drive, Farmington Hills, Michigan 48018 313 553-6300

October 6, 1988
Project No. 84043 AW

Mr. Carroll Wendel
A.C. Spark Plug Division
General Motors Corporation
1300 N. Dort Highway
Flint, Michigan 48556

RE: Status of Groundwater Remediation
Engineering Building Tank Farm

Dear Mr. Wendel:

As requested, we have prepared a brief report on the status of the groundwater remediation underway at the Engineering Building Tank Farm at the A.C. Spark Plug manufacturing facility in Flint, Michigan.

Briefly, the remedial action plan provides for the remediation of the more heavily contaminated perched upper granular unit as well as the lower aquifer at the tank ~~form.~~ farm. To review, the plan contained seven major components:

1. Establishment of a groundwater pumping system.

2. Evaluation of the existing sumps and determination of whether they are suitable for use in collecting the contaminated groundwater. Recovery of hydrocarbons from the area surrounding existing well P-5 and P-6.

3. Recovery of floating hydrocarbons.

4. Remediation of the lower aquifer by pumping at the appropriate time and rate beginning with the existing well, P-14L.

5. Continued groundwater monitoring of the area surrounding the tank farm and monitoring of the recovery system's performance.

6. Development a system for the ultimate treatment of the collected groundwater.

Significant progress has been made on most of the items and some progress has been made on every issue. The paragraphs below outline the work conducted to date on each item, describes any comments or problems encountered, and briefly outlines work to be done.

First, an initial pumping system was established in April, 1988 which included well numbers P-7 and the east and west sumps in the upper aquifer, and P-14L in the lower aquifer. Each well or sump was equipped with a total hydrocarbon recovery pump capable of removing both floating and dissolved hydrocarbons without creating an emulsion. (This type of pump was specified in the plan.) The pumping system is operated through a single controller box which controls the flow rate and amount of compressed air available to each pump. The water pumped from each well is directed into separate 330-gallon steel tanks. The long-term flow rate into the tank has been measured and samples have been collected from the outlet for laboratory examination of benzene, xylene and toluene concentrations. When these individual tanks become full, they are discharged to the process waste system at the plant.

Test pumping at the east sump, west sump, and well nos. P-7, P-5 and P-6, have indicated the following:

1. The west sump has not supplied sufficient water on a continuous basis to justify continuing to pump this sump. Therefore, the pump in the west sump will be relocated to a second location.

2. Pumping levels and rates from the east sump have been significantly affected by the drought. The pumping rate dropped significantly during June and July 1988. Therefore, the pump in the east sump is to be equipped with a float shut-off valve such that it can be pumped out when water level recovery in the sump indicates that sufficient water has accumulated in the sump.

3. Recovery rate testing in well no. P-7 indicates that, prior to the drought, P-7 performed beyond expectations. However, we noted that the rate of hydrocarbon recovery from well No. P-7 decreased significantly. Therefore, attempts were made to improve the recovery rate by "de-silting" the screen.

Unfortunately, either the screen or a screen-casing connection failed (probably weakened by exposure of the PVC to benzene over a number of years) and the interior of the well filled with granular material. Replacement of this well with a steel casing is being planned.

4. Recovery pumping in the area near existing well nos. P-5 and P-6 confirmed the need for a new sump in that area. Although a significant amount of free product was recovered at well no. P-6, the recovery rates are very low and it remains impractical to equip this sump with a permanent pump. Plans are being considered for a location of a large diameter sump located east of the existing tank and immediately west of the interceptor pit. As described in the plan, this new sump will replace existing well nos. P-5 and P-6 in the recovery program.

As specified in the plan, recovery of floating hydrocarbons was also performed in several of the available sumps. Significant floating hydrocarbons were recovered in the early stages of pumping at well no. P-7 and small but significant quantities were recovered from well no. P-6. Hydrocarbon recovery could not be performed at well no. P-2 because of the groundwater had apparently been completely dewatered the sump. However, a small diameter observation point installed in the upper granular unit adjacent to well no. P-2 indicates that gasoline-related products are still located in the upper granular unit at this location. Work on this issue is continuing.

Recovery of hydrocarbons has commenced by pumping at a low rate in well no. P-14L. During this pumping, significant quantities of dissolved gasoline have been recovered and the well can produce at the maximum capacity of the pump as expected. However, the initial pumping rate has been maintained at approximately 0.5 gpm while water level observations have been obtained at well no. P-15U and P-15L. Although the data indicate that the water level in P-15U has declined, it appears that the vertical gradient between P-15U and P-15L has remained relatively constant. Therefore, P14-L has been continuing to pump on a continuous basis a rate of approximately 0.5-gallon per minute. The final pumping rate will be increased if warranted based on review of long-term water level records from P-15U and P-15L.

Monitoring of both groundwater quality and groundwater levels have continued in both the upper unit and the lower aquifer. NTH conducted 5 water level surveys of all wells on five dates since the remedial action plan was prepared in June, 1987. Complete water quality surveys were conducted in November 1987, January, 1988 and August, 1988 using all pertinent wells around the tank farm. Samples have been collected periodically from each of the recovery wells to track progress the results for Well No. P14-L are presented in the table below:

TABLE 1

Hydrocarbon Concentration in Well No. P14-L (in ppb)

DATE	BENZENE	XYLENE	TOLUENE
1-13-88	97,000	NT	NT
7-05-88	24,600	225	210
7-13-88	38,050	NT	NT
8-04-88	23,000	130	NT
8-12-88	21,000	80	20
8-24-88	36,000	NT	NT
9-01-88	21,000	120	65

NT = Not tested

Significant progress was also made in researching an appropriate carbon absorption system for use in ultimate treatment of the recovered hydrocarbons. In April 1987, NTH supplied a specification for distribution to bidders on the various systems. In general, the system is to include canister-type carbon absorption for the combined flow from the available sumps. The discharge after treatment in the system is expected to be no higher than 100 ppb benzene.

The hydrocarbon recovery in proceeding at the A.C. Spark Plug Engineering Building Tank Farm in general accordance with the remedial action plan dated June 22, 1987. Although significant work remains to be accomplished, it appears that the pumping option remains feasible. Water level data from surrounding monitoring wells indicate that the drought has significantly lowered the available ground in the upper unit; water levels in both the upper unit and the lower aquifer are at 4 year lows.

Work in the next few weeks will entail determining a final pumping rate for well no. P-14L, establishing a new sump in the area of well nos. P-5 and P-6, obtaining bids for a carbon adsorption system from selected suppliers, and replacement of Well No. P-7.

We hope that this status report is sufficient for your needs at this time. If you have any questions, please contact me.

Very truly yours,

NEYER, TISEO & HINDO, LTD.

Robert F Gorman

Robert F. Gorman
Project Manager

RFG/bnk

NEYER, TISEO & HINDO, LTD.

Consulting Engineers and Geologists
38955 Hills Tech Drive, Farmington Hills, Michigan 48018 313 553-6300

October 14, 1988

Ms. Susan D. Kelsey
Sr. Environmental Engineer
Divisional Plant Engineering
AC Spark Plug Division of General Motors
1300 N. Dort Highway
Flint, MI 48556

Dear Ms. Kelsey:

I have enclosed a copy of our report entitled Remedial Action Plan - Pumping Option, dated June 22, 1987, for the Engineering Building Tank Farm. This document presents our plan for remediation of the problem at the tank farm.

As the report shows, we have extensive, first hand experience with the soil and groundwater conditions in and around the plant site. We believe that this experience is unique and would allow us to develop and implement a very effective hydrogeologic study plan for your Averill Avenue project. We would be pleased to prepare a proposal on the project for your consideration. We can meet with your team at you convenient to discuss the details.

We look forward to working with you on the, Averill Avenue project.

Very truly yours,

NEYER, TISEO & HINDO, LTD.

Robert F. Gorman

Robert F. Gorman

Sherif S. Afifi

Sherif S. Afifi, P.E.

RFG/SSA/bnk

REPORT ON FIELD INVESTIGATION - 1986/1987

PROJECT NO:	84043 AW
DESIGNATION:	Remedial Action Plan - Pumping Option Engineering Building Tank Farm AC Spark Plug Manufacturing Facility
LOCATION:	Flint, Michigan
CLIENT:	General Motors Corporation AC Spark Plug Division
DATE:	June 22, 1987

TABLE OF CONTENTS

INTRODUCTION

This report presents the results of our continuing investigation of benzene and gasoline migration from the tank farm at AC Spark Plug Division's Engineering Building. The report also presents an alternative conceptual remedial action plan. The plan is based on contaminant recovery through pumping. The Engineering Building Tank Farm is located at the General Motors AC Spark Plug Manufacturing Facility on Dort Highway in Flint, Michigan.

Purpose - The purpose of this investigation is to further evaluate both the vertical and lateral extent of gasoline and benzene migration from the tank farm and to develop supporting information for evaluating the alternative remedial action plan. Specifically, the objectives of the investigation are:

1. To evaluate the extent of contamination away from the tank farm.

2. To remove several of the wells installed by Michigan Testing Engineers in 1983 and to determine if any groundwater contamination exists.

3. To assess the feasibility of remediating the groundwater problem using pumping wells instead of a lateral drain system.

Scope - The scope of this investigation included considering the feasibility of a remedial action plan based on pumping of contaminated groundwater. In 1985, we developed a remedial action plan based on gravity drainage to a lateral drain. This design was based on data presented in our original hydrogeologic investigation (see our report titled "Report on Hydrogeologic Investigation", dated May 25, 1984). The design specifications are presented in a second document titled "Construction Specifications For: Engineering Building Tank Farm Subsurface Drain System", dated August 26, 1985. We have developed this alternative remedial action plan because subsequent information indicated that groundwater contamination may have occurred in a lower aquifer and may have extended outside of the anticipated influence of the proposed drain.

HISTORY OF THE PROBLEM AND SUMMARY OF PREVIOUS INVESTIGATIONS

Since discovering the benzene and gasoline tank leaks in August of 1983, there have been four separate phases of investigation prior to the present investigation. Michigan Testing Engineers (MTE) installed nine 4-inch diameter PVC monitoring wells between August and October 1983. Soil and groundwater testing on samples obtained from these test borings by AC Spark Plug personnel indicated the presence of both gasoline and benzene in soil and groundwater in the vicinity of the tank farm. We have included the logs of each of these monitoring wells as Figures 1 through 9 in Appendix A. The locations of these wells are shown on our Test Boring and Monitoring Well Location Plan, Plate 1, in Appendix B.

In March of 1984, Neyer, Tiseo & Hindo, Ltd. (NTH) was retained by A C Spark Plug. We performed a hydrogeologic investigation in order to evaluate hydrogeologic conditions in the vicinity of the tank farm and to determine the lateral extent of the contaminant plume. During this investigation a total of nine 2-inch diameter steel wells were installed. In our "Report on Hydrogeologic Investigation", dated May 25, 1984, we concluded that most of the gasoline and benzene contamination was still contained within the upper granular unit and had not migrated to any large extent from the tank farm area. The monitoring wells installed during this investigation were designated P-8 through P-13D and logs for these wells are included in Appendix A as Figures 10 through 18.

The third investigation was conducted to evaluate the soil conditions along the probable alignment of the lateral drain which had been proposed as a result of our 1984 hydrogeologic investigation. In the third investigation, which was conducted between February 25 and March 1, 1985, we drilled seven test borings designated TB-1 through TB-7. This investigation generally confirmed that the stratigraphy within the tank farm area consisted of upper and lower granular layers separated by a intervening cohesive unit. A near-surface cohesive unit was also encountered. The logs of these seven test borings are included in Appendix A as Figures 19 through 25. The locations of the test borings are shown on the Test Boring and Monitoring Well Location PLan, Plate 1.

Lastly, during October, 1986, a tank leak testing program was undertaken by subcontractors to AC Spark Plug. During this program, each of the tanks within the tank farm area which were not replaced upon initial discovery of the problem in 1983, were leak tested. In this program, two additional leaking tanks were discovered and replaced. At the conclusion of the program, AC Spark Plug established that the escape of benzene and gasoline into the ground as a result of leakage from the tanks had been stopped.

Since the beginning of our involvement in March of 1984, we have obtained both water level and water quality data on a periodic basis from the monitoring wells surrounding the tank farm facility. These data together with the additional subsurface investigation information collected as described below form the basis for our analysis and evaluation presented in later sections.

The drilling and well installation programs conducted at this site since 1983 by various investigations are included on Table 1. These studies showed subsurface conditions generally consist of a near-surface cohesive unit, a water bearing upper granular unit, a lower cohesive unit followed by a lower granular unit. Piezometric level data indicated the lower cohesive unit hydraulically separates the upper granular unit from the lower aquifer at the site. Results of chemical analyses tests showed extensive gasoline contamination in the upper granular unit and apparently limited contamination in the shallow lower aquifer.

CURRENT FIELD INVESTIGATION

The current field investigation included seven major items and was conducted in late 1986 and early 1987. During this investigation, we collected data to support our evaluation of the remedial action plan presented in this report. Specifically, the seven tasks included:

1. Removal and grouting of five monitoring wells installed in 1983 by MTE.

2. Installation of six new monitoring wells.

3. Evaluation of the possible cause and extent of contamination in the lower aquifer through pumping tests

4. Conducting an aquifer pump test in the lower aquifer to determine the properties and characteristics of the aquifer.

5. Performing a pump test using the existing sumps to determine the extent of the radius of influence of the sumps during pumping.

TABLE 1
SUMMARY OF DRILLING AND ON-SITE
MONITORING WELL INSTALLATIONS

Well/Test Boring No	Date Drilled/ Installed	Consultant	Borehole Depth	Measured Screen Tip Depth	Measured Screen Tip Elevation	Aquifer Monitored	Status
P-1	09/13/83	MTE	30.0	16.1	747.23	Upper	P/A 5/86
P-1A	10/17/83	MTE	55.0	27.0	736.32	Shallow, Lower	P/A 5/86
P-2	09/15/83	MTE	30.0	19.5	744.90	Mixed	MW
P-3	09/14/83	MTE	30.0	18.2	743.88	Shallow, Lower	P/A 5/86
P-4	09/14/83	MTE	30.0	17.1	745.73	Upper	P/A 5/86
P-5	09/15/83	MTE	30.0	21.0	744.56	Mixed	MW
P-6	09/15/83	MTE	30.0	22.2	743.46	Mixed	MW
P-7	09/13/83	MTE	30.0	18.3	744.62	Upper	MW
P-7A	10/18/83	MTE	65.0	27.0	736.31	Shallow, Lower	P/A 5/86
TB-8(P-8)	02/24/84	NTH	60.0	57.0	706.06	Deep, Lower	MW
TB-9(P-9)	02/29/84	NTH	60.0	58.5	702.41	Deep, Lower	MW
TB-10(P-10)	03/01/84	NTH	60.0	56.7	706.80	Deep, Lower	MW
TB-11D(P-11D)	03/27/84	NTH	60.5	55.2	708.75	Deep, Lower	MW
TB-12D(P-12D)	03/31/84	NTH	61.5	55.2	706.36	Deep, Lower	MW
TB-13D(P-13D)	03/30/84	NTH	59.5	45.4	718.12	Deep, Lower	MW
TB-11S(P-11S)	03/23/84	NTH	20.0	19.7	744.42	Shallow, Lower	MW
TB-12S(P-12S)	03/31/84	NTH	15.0	14.2	747.90	Upper	MW
TB-13S(P-13S)	03/30/84	NTH	23.5	23.0	740.20	Shallow, Lower	MW
TB-1	02/25/85	NTH	20.0	NA	NA	Upper	GUP
TB-2	02/26/85	NTH	20.0	NA	NA	Upper	GUP
TB-3	02/26/85	NTH	22.5	NA	NA	Upper	GUP
TB-4	02/27/85	NTH	22.5	NA	NA	Upper	GUP
TB-5	02/28/85	NTH	20.0	NA	NA	Upper	GUP
TB-6	03/01/85	NTH	17.5	NA	NA	Upper	GUP
TB-7	03/01/85	NTH	17.5	NA	NA	Upper	GUP
P-14U	05/20/86	NTH	15.3	16.9	748.92	Upper	MW
P-14L	05/28/86	NTH	33.0	32.7	730.50	Shallow, Lower	MW
P-15U	05/22/86	NTH	14.5	14.8	751.65	Upper	MW
P-15L	05/23/86	NTH	33.0	34.9	731.10	Shallow, Lower	MW
P-16U	05/20/86	NTH	15.0	16.4	749.85	Upper	MW
P-16L	05/16/86	NTH	33.0	34.9	731.27	Shallow, Lower	MW

GUP – Grouted Upon Completion
MTE – Michigan Testing Engineers
MW – Monitoring Well
NA – Not Applicable
NTH – Neyer, Tiseo & Hindo, Ltd.
P/A – Plugged and Abandoned

6. Evaluation of the horizontal permeability of the upper aquifer through a series of slug tests.

7. Evaluation of the extent of gasoline or benzene contamination in the upper granular unit through a series of water quality surveys.

Our field methods and descriptions for each of these tasks are presented below.

Well Removal-MTE Monitoring Wells - The first task in the current field investigation included the removal of five monitoring wells designated as P-1, P-3, P-4, P-1A and P-7A. These wells had been installed by MTE in 1983, prior to our involvement with the project. We supervised the removal of these wells by American Drilling Company between April 15 and May 15, 1986. In each case, the monitoring wells were removed using the following procedure:

A. Several well volumes were bailed from each well which could sustain bailing; well no. P-3 and P-4 were bailed dry.

B. Hollow-stem augers were then drilled 2-3 feet into the top of the PVC casing of each well and the well casing and screen was raised about 2-3 feet and the hollow-stem auger was removed.

C. In order to verify that the entire PVC well screen had been raised, we placed a solid stem auger inside the well casing. Once the presence of the bottom PVC screen had been confirmed, we punched a hole through the bottom with the auger to create a tremie pipe.

D. The tremie pipe was used to grout the boreholes. As the old casing was slowly and continuously removed from the borehole, we added cement-bentonite grout to fill the void and to seal any pathways which may have been created by the well and its pea gravel backfill. Well nos. P-3 and P-4 were grouted by pouring the cement grout through the casing from the ground surface. Borehole nos. P-1, P-1A and P-7A were grouted by injecting grout using the grout pump on the drill rig.

All drilling tools involved in this process were steam-cleaned after the removal of each well in order to minimize the possibility of cross-contaminating the boreholes.

All of the well removal work was done in accordance with the site safety plan developed by Mr. Mike Tillotson, dated April, 1986. Provisions of the plan included use of organic vapor badges attached to the clothing of our inspector and all drilling personnel, use of benzene detector tubes during the well removal process to avoid inhalation of dangerous gases, scanning with an HNu meter (portable photo-ionization instrument for detecting volatile organic compounds), and use of personal safety equipment including Tyvek suits, rubber boots and gloves, respirators and hard hats. During the drilling operations, the HNu meter was used to establish the level of volatile organics. If the HNu readings were below the instruments detection limit [1 part per million (ppm)] the respirators were not worn. All other personal safety equipment was worn at all times.

<u>New Monitoring Well Installations</u> - The second task in the field investigation included the drilling of six test borings and the completion of six monitoring wells designated P-14U, P-14L, P-15U, P-15L, P-16U and P-16L at the locations shown on the Test Boring and Monitoring Well Location Plan, Plate 1.

Test boring nos. P-14U and P-16U were completed with a truck-mounted CME rotary drilling rig using 6-inch outside-diameter hollow-stem augers. Soil samples were generally taken at intervals of 5 feet to a depth of 10 feet and at 2.5-foot intervals to the end of the test boring. Although no chemical testing was conducted on the soil samples, each test boring was drilled with steam-cleaned augers and steam-cleaned drilling tools in order to minimize the possibility of cross-contaminating the boreholes. In each case, all of the 2-inch galvanized casing and casing couplings and stainless steel screens were steam-cleaned prior to installation.

Well P-15U was drilled with a portable tripod-mounted rotary drilling rig in a very confined space near the cafeteria. The tripod rig uses wash-percussion boring techniques to advance the hole. Prior to drilling, a 6-inch diameter casing was driven approximately 10 feet below the ground surface. Soil samples were taken at intervals of 5 feet to a depth of 10 feet and at 2.5-foot intervals to the end of the boring.

Well nos. P-14L, P-15L and P-16L were drilled into the lower aquifer with a CME-75 drilling rig using 6-inch hollow-stem augers until the top of the cohesive unit above the lower aquifer was encountered; this occurred at a depth of approximately 15 feet. Next, the 6-inch diameter casing was set into the borehole and seated into the top of the cohesive layer. Cuttings and drilling spoils were removed from the borehole using a 6-inch diameter roller bit to the bottom of the casing. The hole was then flushed with fresh water and drilling continued with a 6-inch diameter roller bit. However, before advancing the drill hole with the roller bit, the portable HNu meter was used to measure the concentration of volatile organic compounds at the top of the borehole. If volatile organics were measured above the 1 ppm detection limit, the borehole was reflushed with fresh water until the volatile organic concentrations fell below the detection limit. This procedure was used to minimize the possibility of cross-contamination.

Soil samples in each of the test borings described above were obtained using the standard penetration test method (ASTM D-1586). The 2-inch split-barrel contained a 1-3/8" diameter by 3" long liner insert. Soil samples recovered in these liners were designated as "LS" on the respective test boring logs; samples recovered directly from the 2-inch sampler were designated as "S" on the test boring logs. All samples obtained from the sampler were sealed in glass containers and transported to our laboratory for soil classification and possible testing. After each sampling, the split-spoon sampler was initially rinsed with potable water and then finally rinsed with distilled water before collecting the next sample.

Soil and water conditions encountered in the test borings have been evaluated and are presented on individual Logs of Test Boring, Figure nos. 26 through 31 in Appendix A. In addition, the logs present data related to drilling methods, groundwater conditions and the personnel involved. The soil descriptions shown on the logs are based on the field classifications and laboratory tests. For information in aiding understanding the data presented on the logs, General Notes defining nomenclature used in the soil descriptions are presented as Exhibit 1 in Appendix A.

Representative soil samples were subjected to laboratory testing to determine natural moisture content and grain-size distribution. Grain-size distribution was determined by sieve and/or hydrometer analysis. Atterberg limit tests were also performed on representative cohesive samples to determine plasticity. The results of these laboratory tests are presented in Figure 32 in Appendix A. Moisture content data are also presented on the boring logs.

Following completion of the test borings, monitoring wells were installed at each of the locations. The wells consisted of 2-inch diameter galvanized steel casing with slot 10 or slot 7 stainless steel well screens. Prior to installing the well casing, approximately 0.5 to 1.0 feet of Ottawa silica sand was placed in the bottom of the borehole. After installing the well casing and screen, additional Ottawa silica sand was placed in the annular space to a point approximately 2-3 feet above the well screen. Pelletized bentonite or a thick bentonite slurry was then placed on top of this material to a minimum thickness of 1.0 foot. The remaining annular space was then sealed with non-shrinking cement grout to the ground surface. After allowing one day for the grout to setup, each well was developed with a Bremer check valve for a period of approximately 25-30 minutes.

Well no. P-14L was placed so that the well cap was recessed below the surface of the concrete drive. A water-tight 16-inch diameter cover was installed through the asphalt and concrete slab to protect the well head. In all other cases, the well casings extended to 2-3 feet above the ground surface and were equipped with locking caps.

Additional information regarding well construction details, materials used, water level data and personnel involved are provided on individual Log of Groundwater Monitoring Wells, Figures 33 through 38 in Appendix A.

Aquifer Tests-Lower Aquifer - In the third task of the current investigation, we evaluated the possibility that groundwater contamination may exist in the lower aquifer and may be localized in the vicinity of the older monitoring wells. In order to test this possibility, we conducted a short term water quality pumping test using the new well, P-14L. We selected this well because water quality surveys conducted in April and June of 1986 confirmed the presence of gasoline and benzene in the lower aquifer and because P-14L is located less than 5 feet northeast of MTE's well no. P-1A, which had been drilled into the lower aquifer. If the concentration of volatile organic compounds (as measured using the HNu meter) decreased significantly during the water quality pumping test, and remained low, it would support the supposition that the problem was localized and may not have spread significantly in the lower aquifer. In order to test and confirm this supposition, we conducted three separate pumping tests.

The first test was conducted on August 19, 1986. During that test, we pumped water from P-14L using a compressed-air driven bladder pump manufactured by Well Wizard, Inc. at a rate of approximately 1 gallon per minute for slightly more than six hours which included three 1/2-hour rest periods. Water samples were collected at five minute intervals and volatile organic compound concentrations were measured in the head space of the water sample jar with an HNu meter. During the test, the pump was shut off for periods of approximately one-half hour after pumping the well for a period of 1 hour; therefore, the test consisted of four separate pumping periods with three intervening resting periods.

Two additional tests were conducted on September 5, 1986. One of these tests was conducted using the methods described above at well no. P-15L and lasted for a period of approximately 90 minutes. The other test on this date consisted of repeating the pump test at P-14L using methods described above except that the resting periods were eliminated (i.e., the pump was run continuously for approximately 290 minutes). The results of both of the tests conducted at P-14L are presented as a graph, Water Quality Pumping Tests Results, Figure 1 in Appendix B. The results of the test on P-15L are presented in a similar manner as Figure 2 in Appendix B.

In order to evaluate the hydraulic properties and the characteristics of the lower aquifer in anticipation of the need to establish a remedial action pumping program, we conducted a short-term, constant discharge, aquifer pump test. The test was conducted on October 8, 1986. During this test, a jet pump was used to pump water from P-14L at a rate of approximately 15 gallons per minute until the rate of increasing drawdown measured in wells P-15L and P-16L leveled off; this resulted in a pumping period of approximately 180 minutes. During the test, water level observations were made on a log-time schedule at both wells, P-15L and P-16L. Selected water levels were also obtained at other wells in and around the tank farm during the pump test. After shutting off the pump, water level recovery data was obtained in observation well nos. P-15L and P-16L. The results of this test are described in a later section of this report.

Aquifer Tests-Upper Aquifer - In order to assess the properties and characteristics of the upper aquifer, we conducted three single well bail tests, one slug test and a limited pump test using an existing sump in the tank farm area. Bail tests were conducted in well nos. P-6, P-15U and P-16U by bailing water from the well casing until either (a) all the water had been evacuated, or (b) the water level in the well dropped at least 2 feet. The recovery of the water level was then measured on a log-time schedule for a period of approximately 30 minutes. The slug test at P-14U was conducted by filling the well casing with water to the top of the casing and observing the decline in water levels over time for a period of approximately 80 minutes. These tests were conducted on August 19, 1986.

In April, 1986, we also conducted a limited pump test using the east sump. During this test, the east sump (located 12 feet southwest of well no. P-7 as shown on our Test Boring and Monitoring Well Location Plan, Plate 1) was pumped at a rate of approximately 10 gallons per minute until the sump was dry. Water levels were observed in six wells in and around the tank farm. Note that because this test was conducted before the installation of the new monitoring wells, water level observations could only be made in some of the older wells.

We conducted a third pump test on October 8, 1986, which was designed to check the interconnectivity of the two aquifers. During the test, we used the jet pump to pump water from P-14L at a rate of approximately 15 gallons per minute. We observed water levels in well nos. P-15L and P-16L in the lower aquifer and in well nos. P-12S, P-6 and P-14U in the upper aquifer. The results of this test are presented on two graphs, titled Aquifer Interconnection Test, Figures 3 and 4 in Appendix B.

Water Quality and Water Level Surveys - Since January, 1986, 12 water level surveys and four water quality surveys have been conducted at the monitoring wells in and around the tank farm area. Water level data was collected in April, May, July, August, September, and October 1986, and in January and June 1987. These data and all earlier water level observations for all wells on-site, including those which have been subsequently removed, have been tabulated in a complete compilation of water level elevations for the tank farm facility. These data are presented on Table 2, Compilation of Groundwater Level Elevations, Figure 5 in

Appendix B. We retained Burmah Technical Services to conduct water quality surveys in April, June, and August 1986, and in January 1987. The results of these water quality surveys have also been compiled in a tabulation which includes all of the water quality sampling data collected in the wells in and around the tank farm area. The data are presented on two tables, one table for benzene data and one for gasoline data. The values reported as the concentration of gasoline actually represent the sum of the concentration of benzene, xylene and toluene as observed by the laboratory. After discussions with A C Spark Plug personnel, it was decided to report gasoline in this manner for simplicity. The table of benzene data is a subset of the gasoline values as only the benzene concentrations found in the samples tested are reported. The benzene and gasoline data are presented in Appendix B as Figures 6 and 7, respectively.

SOIL AND GROUNDWATER CONDITIONS - UPDATED

The results of our current field investigation generally support the conclusions presented in our earlier reports on soil and groundwater conditions in and around the tank farm area. The subsoil conditions (stratigraphy) were subdivided into four principal units and described in both our 1984 "Report on Hydrogeologic Investigation" and our 1985 "Report on Supplemental Soil Investigation" for the proposed collection drain. Because the subsurface conditions have been thoroughly described, we will update this information as necessary and focus on groundwater conditions that are pertinent to this proposed remedial action alternative.

Stratigraphy - The tank farm area's stratigraphy can be subdivided and described as four principal units. From the ground surface downwards, these are (1) a near-surface cohesive unit underlain by (2) an upper granular unit which is water bearing and contains significant benzene and gasoline contamination, (3) a lower cohesive unit including clayey silt, silty clay and silt, and finally (4) a lower granular unit. These layers are described in our 1984 and 1985 reports mentioned above. In order to illustrate the stratigraphy, we have developed four generalized geologic cross sections for the tank farm area. The east and west sections are along the east and west boundaries of the tank farm and are presented on Plate 2 titled, Generalized Geologic Cross Sections East and West, while the north and south sections are presented on Plate 3 with a similar title. We have also prepared three cross sections through the tank farm in order to show the subsurface conditions near the tanks. These are presented as Plate 4 in Appendix B. The lines of section are presented on the Test Boring and Monitoring Well Location Plan, Plate 1.

The upper cohesive unit is above the level of the tanks and is not generally involved in the benzene-gasoline contamination problem. Each of the three remaining units are critically important in understanding the problem. Pertinent information on each of these units is described below.

Test borings drilled during the current investigation generally confirm the thickness and character of the upper granular unit. As shown on the general geologic cross-section, the upper granular unit is a brown silty sand to silty fine sand. Single well in-situ permeability tests performed during the current investigation at wells P-14U, P-15U and P-16U indicate that the coefficient of horizontal permeability of $8.4x10^{-5}$ centimeters per second (cm/sec), $1.0x10^{-4}$ cm/sec and $3.9x10^{-4}$ cm/sec, respectively.

The third unit, labelled as the lower cohesive unit, was found in all of the new test borings. As previously presented, this layer consists of silts, clayey silts and silty clays and appears to be more cohesive and somewhat more plastic in the upper portions of the unit. Based on the results of laboratory permeability tests conducted during the 1984 hydrogeologic investigation and the 1985 supplemental soil investigation, the permeability of this unit ranges from 2.1×10^{-6} cm/sec as measured on non-plastic silt sample taken from the lower portion of the unit to 2.7×10^{-8} cm/sec as measured in a gray silty clay sample from the upper portions of the unit at TB-9. This layer also appears to serve as a confining layer for the underlying lower granular unit. As we noted in our 1984 hydrogeologic report, this layer was not encountered in test borings TB-13 and TB-10 on the western side of the area. Because the clay was encountered in test boring no. 15U, this cohesive unit appears to "pinch out" between test boring nos. 15U and 13D. The layer does appear to be continuous both to the north, i.e., test boring no. 12D, and to the south, i.e., test boring no. 11D.

Finally, the lower granular unit was also encountered in all of the deep test borings drilled during the current investigation. We confirmed that this unit is a horizontally extensive silty sand with layers of coarse sand and gravelly sand. Based on the results of the constant discharge aquifer test conducted on October 8, 1986, the transmissivity of this unit ranges from 20,000 to 29,000 gallons per day per foot (gpd/ft). The storage coefficient, which we computed from this pump test, is on the order of 0.0003.

The direction and velocity of groundwater flow in both the upper and lower aquifers are important base data in developing a remedial action plan based on pumping. Water level observations in on-site monitoring wells, tabulated in Table 2 and shown as Figure 5 in Appendix B, were used to map the groundwater flow direction in both of these units. Analysis and evaluation of the water level data indicate that the groundwater hydrology in the vicinity of the tank farm must be considered in three sections: (1) upper granular unit; (2) shallow lower aquifer; and (3) deep lower aquifer. The groundwater monitoring wells which monitor each of these units are shown on Table 1 (following page 4). Groundwater conditions including the hydrology and the groundwater quality in each of the three sections are presented separately below.

Groundwater Conditions-Upper Granular Unit - Based on our analysis of groundwater level data, we concluded that the upper granular unit is accurately monitored by wells P-1, P-4, P-7, P-14U, P-15U, and P-16U. Our analysis of water levels in wells P-2, P-5, and P-6 indicate that water levels in these wells represent a composite water level. The water level in P-2, for example, is always lower than the water level in P-15U (in the upper granular unit) and is always higher than the water level in P-15L (in the shallow, lower aquifer). The resulting "composite" water level occurs because the 10-foot long well screens extend into the lower cohesive unit; the loss of head as groundwater moves through the confining layer is being reflected in the water level in these wells. Water levels in both P-5 and P-6 show similar characteristics.

The groundwater flow direction in the upper granular unit is illustrated on Plate 5 in Appendix B. Water level data collected in 1985 and 1986 indicate that the groundwater flow in this unit is to the northwest towards a groundwater low at P-14U. We have presented contour maps of the water level data for both August 13, 1986 and June 12, 1986. Both of these contour maps show the northwesterly groundwater flow direction although the water levels in June were somewhat higher than the water levels in August.

The consistency of the groundwater flow direction can be demonstrated through the hydrographs presented in the upper left-hand corner of Plate 5. In of the hydrocarbons range from 0.5 foot to 1.3 feet. Subsequent surveys indicated decreasing hydrocarbon thickness. The survey in January, 1987 indicated a thickness of only 0.1 foot at well no. P-6. The floating hydrocarbon thickness measurements obtained during the water level surveys are tabulated and presented as Figure 8, Thickness of Floating Hydrocarbons in On-Site Monitoring Wells. This tabulation is presented in Appendix B.

Groundwater Conditions-Shallow, Lower Aquifer - The groundwater conditions including groundwater flow direction and groundwater quality in the upper portion of the lower aquifer (i.e, immediately below the confining layer) are indicated by data from wells P-1A, P-3, P-7A, P-11S, P-13S, P-14L, P-15L and P-16L. As shown on Table 1, the measured screen tip elevations for this group of wells range from approximately Elevation 730 to 744. The average well tip elevation of this group is approximately 20 feet lower than the average tip elevation of the wells set in the upper granular unit.

Groundwater level and groundwater quality data for the shallow, lower aquifer are presented on Plate 6 in Appendix B. The groundwater levels in the upper portion of the lower aquifer range from approximately Elevation 743 to 745, some ten feet lower than the water levels in the upper granular unit. Groundwater flow direction in the shallow, lower aquifer can be ascertained from the two groundwater level elevation contour maps presented on Plate 6. Both of the maps show that the groundwater flow to the northwest under very flat gradients with no apparent sink as was evident in the upper aquifer. The groundwater hydrographs in the upper left-hand corner of Plate 6 show that the groundwater flow direction has been fairly consistent through the latter half of 1986 and early part of 1987. Well no. P-14L consistently has the lowest water level elevation, while wells P-15L and P-16L consistently have the highest water level elevation. Although the in the upper aquifer should be reduced to acceptable levels before initiating a pumping remediation program in the lower aquifer in order to avoid inadvertently spreading contamination into the lower aquifer. Following remediation of the upper aquifer, remediation of the lower aquifer by pumping is feasible.

CONCLUSIONS

Based on our analysis and evaluations, we present the following conclusions:

1. The hydrogeologic conditions in the upper granular unit are characterized by a thin saturated zone with groundwater movement generally to the northwest, apparently drawn by a groundwater sink near monitoring well no. P-14U. The upper granular unit is composed of a fine sand and silty sand with a permeability which averages 2×10^{-4} cm/sec based on single well bail tests.

2. Hydrogeologic data collected from the lower aquifer indicates that the aquifer is thicker and significantly more permeable than the upper granular unit. The constant discharge pump test results indicate transmissivity of more than 20,000 gpd/ft and a storage coefficient on the order of 0.0003. Groundwater in the shallow lower aquifer moves to the northwest.

3. The upper granular unit is contaminated with dissolved benzene, dissolved gasoline and floating hydrocarbons both within the tank farm area and away from the tank farm at the locations of wells P-14U and P-15U.

general, if the groundwater flow direction is not changing over time, the hydrographs of the wells will be parallel lines; if the groundwater gradients are also consistent, these lines will be equally spaced. The hydrographs on Plate 5 are generally parallel, indicating that the groundwater flow direction in the upper granular unit is fairly consistent and is always to the northwest; water levels in P-14U are consistently lower than all other water levels in the wells in the upper granular unit. P-16U is upgradient in the upper granular unit, but does not always have the highest water level in the data set. Wells P-15U, P-7 and P-12S are crossgradient at various positions within the flow field.

The extent to which the upper granular unit is contaminated by both floating and dissolved hydrocarbons can also be assessed using the data presented on Plate 5. The concentration of gasoline and benzene obtained during the 1985 and 1986 water quality surveys is presented in tabular form next to each of the upper granular unit wells. As described earlier, all of the water quality data are tabulated and presented as concentrations of benzene, Figure 6, and concentrations of gasoline, Figure 7 in Appendix B. Concentrations of gasoline were highest in well P-14U, while lower but significant concentrations of gasoline were found in wells P-7 and P-15U. The highest concentrations of both gasoline and benzene in the upper granular unit were at P-14U, while no significant benzene or gasoline contamination were indicated at well P-16U; this water quality data tends to confirm the groundwater flow direction data established based on water levels as presented above. The percentage concentrations of gasoline in well no. P-2 probably reflect the presence of free-product in that well.

Observations obtained during several of the water level surveys indicate that the free-product, i.e., floating hydrocarbons, have been found in wells P-2, P-5, P-6 and P-7. Based on the survey conducted on August 13, 1986, the thickness groundwater flow direction is similar to that as shown in the upper granular unit, the groundwater gradients in the shallow, lower aquifer are significantly lower than those in the upper granular unit.

A significant vertical gradient also exists between the upper granular unit and the shallow, lower aquifer. The well nest, consisting of well nos. P-16U and P-16L, indicate that a significant vertically downward gradient exists between the two units, ranging up to 0.6 ft/ft. This significant vertically downward gradient is also noted by comparing the water levels at P-12S and P-12D.

The presence of a vertically downward gradient and the results of our pumping tests indicate that the lower aquifer is confined and separated from the upper granular unit by the lower cohesive unit. This is further supported by the storativity computed from the constant aquifer discharge tests, conducted using well no. P-14L, and by the results of the aquifer interconnection test, conducted on October 8, 1986. As shown on the graphs (Figures 3 and 4 in Appendix B), the water levels in P-15L and P-16L declined consistently during the first 300 minutes of the aquifer interconnection test. During that same period, water levels in P-12S, P-6 and P-14U showed little if any change (see Figure 4).

The groundwater quality in the shallow, lower aquifer is also presented on Plate 6. Groundwater quality data from these wells in the lower aquifer show that it has been impacted to a limited extent by benzene and gasoline contamination. While no gasoline or benzene above the detection limits has been noted in any of the shallow, lower aquifer wells outside of the immediate tank farm area, wells P-14L and P-15L have shown both benzene and gasoline contamination. For example, gasoline contamination in P-14L ranges from 81000 parts per billion (ppb), as measured on January 29, 1987, to 163,000 ppb, measured on June 12, 1986. Concentrations at well P-15L were at 9,150 ppb on June 12, 1986 and reduced to below the detection limit of 50 ppb as measured on January 29,1987. While no gasoline was measured at P-16L, benzene concentrations ranging from 2 ppb to 140 ppb have been measured in this well. Beyond the tank farm, no gasoline or benzene above the detection limit has been noted in any of the samplings at wells P-11S or P-12S.

Floating hydrocarbon was measured at P-14L on both August 13, 1986 and September 4, 1986 at thicknesses of 0.5' and 0.1', respectively. Subsequent surveys in September, 1986 and January and June, 1987 showed no measureable thickness of floating hydrocarbons at P-14L.

Groundwater Conditions-Deep, Lower Aquifer - Lastly, the groundwater conditions at depth within the lower aquifer are shown on Plate 7. The data used to compile this plate comes from P-8, P-9, P-10, P-11D, P-12D and P-13D. As noted on Table 1, the measured screen tip elevations range from Elevation 702 to 718; this is some 20 to 25 feet lower than well screens in the shallow, lower aquifer group. As shown on Plate 7, the groundwater flow direction within this deeper portion of the lower aquifer is to the northeast under very low horizontal hydraulic gradients, similar to the pattern first presented in our 1984 hydrogeologic investigation report.

The groundwater flow direction of the deep, lower aquifer over time is less consistent than the flow direction in either the upper granular unit or the shallow, upper aquifer. The variation of groundwater level over time shown by the hydrograph in the upper left-hand corner of Plate 7 indicates that the groundwater flow direction seems to vary somewhat. Water levels in well nos. P-8 and P-12D are particularly variable and may indicate groundwater flow direction variations over time. Data from well nests, particularly P-11S and P-11D, indicate a small vertically downward gradient within the lower aquifer itself. This gradient averages 0.005 ft/ft and ranges from 0.002 to 0.09 ft/ft.

Groundwater quality in the deeper portions of the lower aquifer is generally very good. As shown on Plate 7, neither gasoline or benzene have been measured above the detection limit in any of the wells in this group in the vicinity of the tank farm. This also tends to support the data from the group of shallow, lower aquifer wells, which indicates that contamination in the lower aquifer has not significantly spread either vertically or horizontally.

ANALYSIS AND EVALUATION

Extent of Groundwater Contamination-Upper Granular Unit - The distribution of benzene and gasoline contaminants in the upper granular unit are controlled by several factors. First, as shown on the groundwater contour map, Plate 5 in Appendix B, groundwater appears to move towards a consistent low point near P-14U; in fact, on several occasions this well has been dry. Examination of available plans for the manufacturing facility indicate a sump west and southwest of P-14L near the Test Building and northeast of the buried underground tank. (This sump is shown on the Test Boring and Monitoring Well Location Plan, Plate 1.) It is possible that this sump is causing the long-term groundwater low in this area and diverting groundwater flow to the northwest. Earlier water level data, taken in well P-1, also suggested a groundwater low in that area. Second, because of the number of tanks which leaked and the rate of groundwater flow, it appears that multiple small plumes of benzene and gasoline contamination have been introduced into the upper granular unit. The concentration of gasoline and benzene in some of the wells (e.g., P-2 and P-7) may be due more to their proximity to a tank which leaked than to groundwater movement. Third, the distribution appears to be controlled by the affects of buried infrastructure. As shown on the cross-sections, particularly sections A-A', B-B', and C-C' (Plate 4, Appendix B), the waste processing sump appears to extend below the upper granular unit's water level and may actually be collecting groundwater in that area. Other pipelines including the four-inch water main which runs east-west through the area and the underground tunnel on the far western side of the tank farm may also be collecting groundwater and modifying the direction of movement of the gasoline and benzene contaminants.

Although the gasoline and benzene contamination has spread beyond the limits of the tank farm in the upper granular unit, we have defined the limits of its spread. The northeastern limit is between wells P-7 and P-12S; no benzene or gasoline contamination has been found at well P-12S. Similarly, because no contamination has been found in well P-16U, we believe the southeastern limit of contamination is between wells P-6 and P-16U. Based on the water level data, the significant groundwater low in the vicinity of well P-14U effectively is the northwestern limit; contaminants in well P-15U should move to this groundwater low rather than to the west.

Floating hydrocarbons also represent a significant contaminant in the upper granular unit. Although the amount of floating hydrocarbons appears to have decreased in recent measurements, it is not unreasonable to expect significant amounts of product floating on the groundwater. This may be particularly true at wells P-2, P-5, P-6 and P-7. Any remediation plan utilizing a pumping option will have to consider both the floating contaminants and the dissolved contaminants.

Extent of Groundwater Contamination-Shallow Lower Aquifer - As described earlier in this report and in previous reports, we suspected that benzene and gasoline may have moved from the upper aquifer into the shallow lower aquifer along the annular space between the PVC casing and the well bore in several of the four-inch diameter, PVC monitoring wells installed by MTE. We believe that if this had happened, the groundwater contamination in lower aquifer may not be widespread, particularly because of the very low groundwater gradients in the lower aquifer.

To check this prospect, we conducted a water quality pump test using P-14L and P-15L. The results of two tests at P-14L are presented on Figures 1 and 2 in Appendix B. As shown on the graphs, pumping for a period of approximately five hours during the initial test in P-14L reduced the volatile organic concentration as measured by the HNu meter from 500 ppm to approximately 100 ppm. However, the initial concentration during the second test, which was conducted nearly two weeks later, was 700 ppm (higher than the initial concentration at the start of the first test). In both tests the concentration appeared to reach an asymptote; at approximately 100 ppm in the first test and 300 ppm in the second test. It is apparent then that pumping at the rate of 1 gpm for the duration of the test did not remove all contaminants in the vicinity of wells P-14L and former well P-1A. The test results do not conclusively show that the lower aquifer contamination is entirely the result of the installation of well P-1A.

The results of one pumping test conducted at P-15L showed a similar pattern. The VOC concentration there was reduced from 60 ppm to approximately 2 ppm over a similar five hour period. As in the previous test, although the concentration reduction was significant, the rate of reduction leveled off by the end of the test. Subsequent water quality surveys of the well show that both benzene and gasoline contamination persist.

Although the contamination in the lower aquifer is apparently not immediately localized around the old wells, we believe that the contamination is not widespread in the lower aquifer for four reasons. First, the data collected on January 7, 1987 shows a significant improvement in the quality of the water in the lower aquifer. For example, the floating hydrocarbons which were present on August 13, 1986 in well P-14L were no longer measurable in the January 7, 1987 reading. Second, dissolved gasoline and benzene concentrations as measured January 30, 1987 are significantly lower than previous measurements in lower aquifer wells. Approximately 8,000 gallons of water were pumped from the lower aquifer at wells P-14L and P-15L between August 19 and October 8, 1986 as a result of the pumping tests which were performed during that period. The reductions in gasoline and benzene levels may be due to this pumping effort. Third, no significant benzene or gasoline contamination was measured in the deeper sections of the lower aquifer or at well numbers P-11S and P-13S in the shallow, lower aquifer.

Lastly, contaminant movement in the lower aquifer should also be limited by the very small horizontal hydraulic gradient. Based on the most recent data and assuming a porosity of approximately 15 percent, the velocity of groundwater should still be less than 0.04 feet per day. Assuming that contaminant movement is solely controlled by the groundwater velocity, the contaminants can be expected to move less than 60 feet even if they had been introduced into the shallow lower aquifer in late 1983 when the tank leaks were initially discovered.

appears to have significantly reduced these concentrations. For reasons described above, we believe that the contaminants in the lower aquifer have not spread widely and could be collected through a pumping program.

Feasibility of Remedial Action Based on Pumping Existing Wells and Sumps - In order to assess the feasibility of remedial action based on pumping, the remediation objectives must be established. The feasibility analysis presented below is based on the following objectives:

1. All floating product should be collected prior to or together with collection of the dissolved gasoline and benzene.

2. The highest concentrations of dissolved gasoline and benzene should be collected first.

3. Contaminants should be reduced to acceptable levels in the upper granular unit before pumping from the lower aquifer, in order to minimize the potential for downward movement of the contaminants into the lower aquifer.

4. The program must provide a monitoring program to observe and verify the effectiveness of the remedial action plan.

We have prepared an analysis of the feasibility of remedial action using pumping based on the remediation objectives described above. The remediation in the upper granular unit and the lower aquifer are discussed in separate sections below.

Upper Granular Unit Pumping Feasibility - Pumping in the upper granular unit will be constrained by both hydrogeologic and man-made barriers. The pumping rate and the size of capture zone created by a recovery well or sump will be limited by 1) the saturated thickness in the upper aquifer, 2)the permeability of the granular material, and 3) the infiltration rate into the upper aquifer. Buried infrastructure including the underground tank outside the northwest corner of the tank farm, the adjacent tunnel on the west side of the tank farm and the process waste water sump near well no. P-5 represent man-made barriers which may act to reduce the effectiveness of any pumping well. In some cases, these infrastructure and the gravel bedding around them may already be collecting groundwater. All these factors are important in considering a pumping alternative for remediation of the upper granular unit and limit the accuracy of capture zone predictions.

There are six wells in or through the upper granular unit which may be candidates for inclusion in the pumping recovery remediation alternative. These wells include P-2, P-5, P-6, P-7, P-14U, and P-15U. Each of these wells is considered below.

Based on the results of field tests and observed well behavior during well sampling, neither well P-5 nor P-6 will provide sufficient yield to serve as effective recovery wells. Bailing tests on well P-6 indicate that it would not sustain continuous pumping; the well generally yields less than 5 gallons of water and recovers slowly. As can be seen on the cross-sections, the lower portion of the well screen in this well is set in the top of the cohesive unit. Well P-5 has similar problems. It is located near the process waste water sump and was drilled through an old abandoned foundation. Part of the well screen penetrates this two-foot thick concrete foundation and may be responsible for reducing its yield.

Well no. P-2 may be effective in recovering floating hydrocarbons but will be of limited effectiveness as a contaminant recovery well for collecting dissolved gasoline and benzene in the upper granular unit. The sustainable pumping yield from well P-2 is limited because much of its screen length is in the lower cohesive unit; however, well P-2 has generally had a significant thickness of floating hydrocarbon product which may have resulted from its proximity to a tank which leaked.

The results of the bail test at P-15U indicate that its sustainable yield may be significantly higher. Although recent water quality surveys indicate that dissolved benzene and gasoline are present at the location of well P-15U, the capture zone created by pumping at this well may collect significant amounts of uncontaminated water.

Although the sustainable yield from well P-7 is expected to be low, this well may be an appropriate recovery well because of its position in the groundwater flow field and because it has contained floating hydrocarbons. Unfortunately, this well has the average available drawdown of only four feet and will probably be able to sustain pumping yields of approximately one gallon per minute. If pumped continuously at this rate, however, the well would produce more than 1400 gallons a day. Because of the very low expected well yield, continuous pumping will be necessary in order to provide any continuous capture zone at this location.

Well P-14U also has an advantageous position both with respect to the contaminants and the depth of its well screen. However, the effect the groundwater sink located several feet southwest of P-14U apparently causes the water level in this well to drop below the bottom of the screen on occasion.

Because the tip of the well screen is set near the top of the lower cohesive unit, it would not be effective to drill a deeper well.

Both the existing east and west sumps whose locations are shown on the Test Boring and Monitoring Well Location Plan, Plate 1, are also candidates for incorporation into a pumping recovery scheme. These sumps have already been used on an interim basis to collect contaminants periodically through 1985 and 1986. The upper granular unit pump test, which we conducted in April, 1986 using the east sump, indicated that the capture zone or radius of influence of the east sump extended across the entire tank farm area. For example, water level in P-2 dropped slightly more than 0.2 ft during the test. The east and west sumps could be effectively used in a pumping scenario if a continuous pumping rate can be established on a long-term basis.

Lower Aquifer Pumping Feasibility - Analysis of the feasibility of implementing a remedial action plan through pumping in the lower aquifer must consider the nature of the contaminants, the permeability of the lower aquifer, and the location and position of the existing wells. Unlike the upper granular unit, the lower aquifer is quite permeable, may be as much as 25 feet thick, and should yield significant quantities of water to a pumping well. Results of our constant discharge pumping test indicate that well nos. P-14L, P-15L and P-16L should all be able to support pumping rates in excess of 15 gallons per minute. Pumping from existing wells P-15L and P-14L at rates of 15 gpm will create a capture zone which will encompass the entire tank farm area in the lower aquifer.

However, the pumping of the lower aquifer will increase the vertical gradient between the lower and upper aquifers. This may have a tendency to drive contaminants into the lower aquifer. Therefore, the concentration of contaminants

4. Contamination by dissolved gasoline and benzene has also been found in the shallow lower aquifer. Based on the low hydraulic gradients, the improvement in water quality in the lower aquifer in recent water quality surveys, we do not believe that benzene and gasoline contamination in the lower aquifer is widespread.

5. Remediation of the upper granular unit by pumping is feasible . To accomplish this, additional wells will need to be constructed, but the pumping program may incorporate at least two of the existing wells. It appears that remediation through pumping in the upper granular unit will be most successful if a continuous, long-term pumping rate can be established for all sumps. Intermittent pumping may also meet the intent of hydrocarbon control in the upper aquifer, but it may take a significantly longer time. In this case, more sump locations and observations wells would be required.

6. Remediation of the lower aquifer by pumping is feasible but should not be undertaken until the contaminants in the upper aquifer have been reduced to acceptable levels.

RECOMMENDATIONS

Based the data presented in this report, we recommend the following remedial action plan elements:

Upper Granular Unit Remediation-Pumping Option

1. Existing monitoring well nos. P-5 and P-6 should be removed and the hole in the cohesive layer should be grouted with a low permeability

cement-bentonite grout. These wells should be replaced with eight-inch diameter steel well casing and screen (or equivalent well design) whose tip is set one foot into the top of the lower cohesive unit. This well should be equipped with pumping equipment which can remove both floating and dissolved hydrocarbons without creating an emulsion. This well should be operating through an automatic controller system which includes shut-off options when water levels drop below the pump intake.

2. Three additional contaminant recovery sumps should be installed in the area bounded by wells P-7, P-14U and P-15U. These sumps should also be seated approximately one foot into the top of the lower cohesive unit and should be equipped with similar bladder pumps and operated through the controller system.

3. Floating hydrocarbon recovery should be attempted at wells P-2 and P-7. This should be accomplished by installing a small diameter compressed-air operated bladder pump and pumping on a regular basis as the well yield will allow.

4. If the sustained yield can be developed for the east and west sumps and well P-7, then these wells should be equipped with a bladder pump and incorporated into the pumping system.

5. Groundwater monitoring should continue every two months at monitoring well nos. P-14U, P-15U, P-16U and at all new sumps. A new pair of upper and lower aquifer monitoring wells should be installed northwest of well P-14U and between wells P-7 and P-12S. All samples should be tested for the presence of dissolved benzene, xylene and toluene.

6. We suggest a first phase maximum contaminant target level of 100 ppb. When the concentrations of benzene, xylene and toluene have dropped below 100 ppb in all monitoring wells and sumps, further analysis of the groundwater hydraulics should be performed and the effectiveness of this pumping scheme should be re-evaluated.

7. Negotiations should be undertaken with regulatory agencies to establish a final target level for maximum contaminant levels below the 100 ppb level. Depending upon the target levels agreed upon, other alternative remediation methods should be considered. These could include reducing or eliminating the infiltration by paving the tank farm area and introducing biodegradation agents into the soil below the concrete cover. At this point, the groundwater monitoring scheme should also be re-evaluated.

8. The storage and treatment of the contaminated groundwater could proceed as outlined in the plans and specifications for the proposed lateral groundwater drain system.

Lower Aquifer Remediation

1. Wells P-14L and P-15L should be pumped at a rate which will not increase the vertical hydraulic gradient within the tank farm area as the remedial action plan in the upper granular unit proceeds. This rate should be determined based on field observations of aquifer response to pumping. If upon completion of the remediation in the upper granular unit, the contaminants in the lower aquifer remain above the target levels, then the pumping rate should be increased to the maximum sustained yield of the lower aquifer wells.

2. Additional monitoring and periodic pumping in well P-16L will also be necessary in order to reduce the benzene concentration in that well.

Respectfully submitted,

Robert F. Gorman

Robert F. Gorman

Sherif S. Afifi

Sherif S. Afifi, P.E.

Jerome C. Neyer -gt

Jerome C. Neyer, P.E.

June 22, 1987

APPENDIX A: Test Boring/Well Logs and Test Data

MICHIGAN TESTING ENGINEERS, INC.
CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

PROJECT Observation Well Job #8954

JOB NO 411-35023 Boring No: P1

LOCATION A.C. Spark Plug Division
Flint, Michigan

* New Well Installed (see below)
Boring Logs revised on 10-26-83 DATE 9-13-83

Sample Type	Depth	Legend	Soil Description	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
		0'3"	Asphalt						
	1	0'8"	Concrete						
	2–5	5'0"	SAND, brown, moist						
	6–13	13'0"	Silty CLAY, brown, moist						
	14–15	15'0"	Medium SAND, grey, wet with gasoline odor						
	16–22	22'0"	SILT, grey, wet						
	23–25		Fine SAND, brown, wet						

TYPE OF SAMPLE
D - DISTURBED
U L UNDIST. LINER
S T - SHELBY TUBE
S.S. - SPLIT SPOON
R C. - ROCK CORE
( ) - PENETROMETER

REMARKS:
Groundwater encountered at 13'0"

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30", Count Made At 6" Intervals

GROUND SURFACE ELEV. 763.28

Figure 1 -

CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

PROJECT Observation Well JOB #8954

JOB NO. 411-35023 Boring No: P1

LOCATION A. C. Spark Plug Division

Flint, Michigan

DATE 9-13-83

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength P.S.F.	Str. %
	26	26'0"	Fine SAND, brown, wet						
	27								
	28		Medium SAND, brown, wet						
	29								
	30	30'0"							
			End of Boring						
		NOTE:	* New well installed in bore hole during period from 10-17-83 thru 10-24-83. See detail B in report dated 10-26-83 for typical profile of the well installed at this location.						

TYPE OF SAMPLE
U - DISTURBED
UL - UNDIST. LINER
ST - SHELBY TUBE
SS - SPLIT SPOON
RC - ROCK CORE
( ) - PENETROMETER

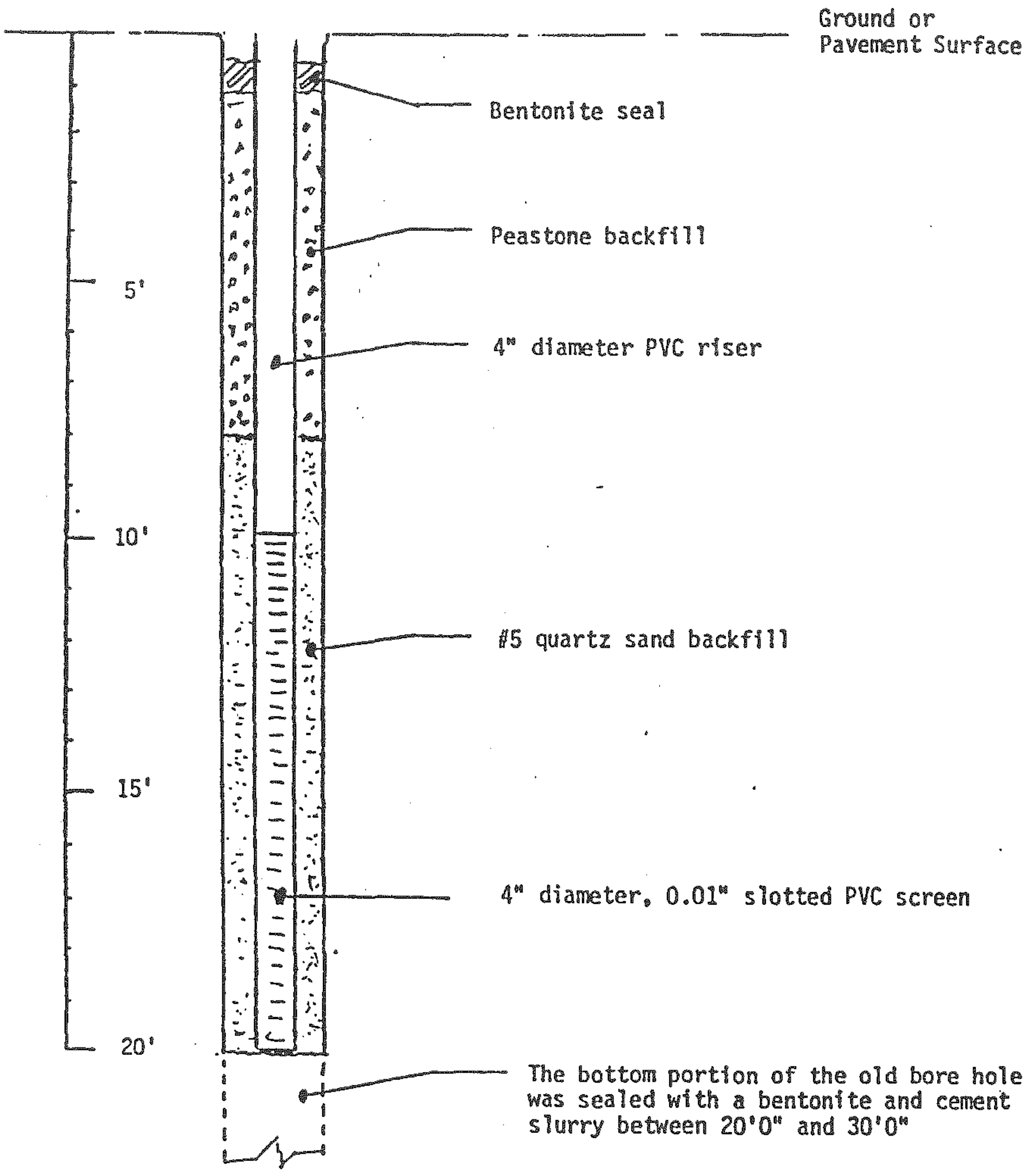
REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

Figure 1

OBSERVATION WELL DETAIL B

Typical for Boring Numbers
P1, P3 and P4



PROJECT NAME	
Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	Vertical Scale 1"=3' PROJECT NO. 411-35023 — DATE October 25, 1983

Figure 1

MTE CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

JOB NO. 411-35023 Boring No: P1A

DATE 10-17-83

PROJECT Observation Well Job #8954

LOCATION 6' east of P1
A.C. Spark Plug
Flint, Michigan

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
		0'3"	Asphalt						
	1	0'8"	Concrete						
	2–5	5'0"	SAND, brown, moist						
	6–13	13'0"	Silty CLAY, brown, moist						
	14	14'0"	Fine SAND, brown, wet with gasoline odor						
1SS	15–16	16'6"	SILT, gray, moist, dense	5 10 11					
2SS	17–24	24'0"	Sandy SILT, gray, moist, very dense	10 18 17					
3SS	25		Medium SAND, brown, wet, medium dense	3 4 4					

TYPE OF SAMPLE
D - DISTURBED
U.L. - UNDIST. LINER
S.T. - SHELBY TUBE
S.S. - SPLIT SPOON
R.C. - ROCK CORE
( ) - PENETROMETER

REMARKS: Groundwater encountered at 13'0" and at 24'0"

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

GS @ EL
765.28

Figure 2

MICHIGAN TESTING ENGINEERS, INC.
CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

JOB NO. 411-35023 Boring No: P1A

PROJECT Observation Well Job #8954

6' east of P1

LOCATION A.C. Spark Plug

Flint, Michigan

DATE 10-17-83

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	26								
	27								
	28								
	29								
4SS	30		Medium SAND, brown, wet, medium dense	3 4 5					
	31								
	32								
	33								
	34	34'0"							
5SS	35			5 8 10					
	36								
	37		Medium SAND, brown, wet, very dense						
	38								
	39	39'0"							
6SS	40			3 5 8					
	41		Medium SAND, brown, wet, dense						
	42								
	43	43'6"							
	44								
7SS	45			9 16 20					
	46								
	47		Coarse SAND, brown, wet, very dense						
	48								
	49								
8SS	50			22 26 45					
	51								

TYPE OF SAMPLE
D - DISTURBED
U L UNDIST. LINER
S T - SHELBY TUBE
S S - SPLIT SPOON
R C - ROCK CORE
( ) - PENETROMETER

REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30" Count Made At 6" Intervals

Figure 2

CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

JOB NO. 411-35023 Boring No: P1A

PROJECT Observation Well Job #8954

LOCATION 6' east of P1 A.C. Spark Plug Flint, Michigan

DATE 10-17-83

	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	52	52'0"	Coarse SAND, brown, wet, very dense						
	53		CLAY with a trace of fine gravel, gray, moist, hard						
	54			51					
SS	55	55'0"		100					
			End of Boring	--					
		NOTE:	Observation well installed in bore hole on the date indicated above. See Detail C in report dated 10-26-83 for typical profile of the well installed at this location.						

OF SAMPLE
- D.L. - DISTURBED
- U.L. UNDIST LINER
- S.T. - SHELBY TUBE
- S.S. - SPLIT SPOON
- R.C. - ROCK CORE
- P. - PENETROMETER

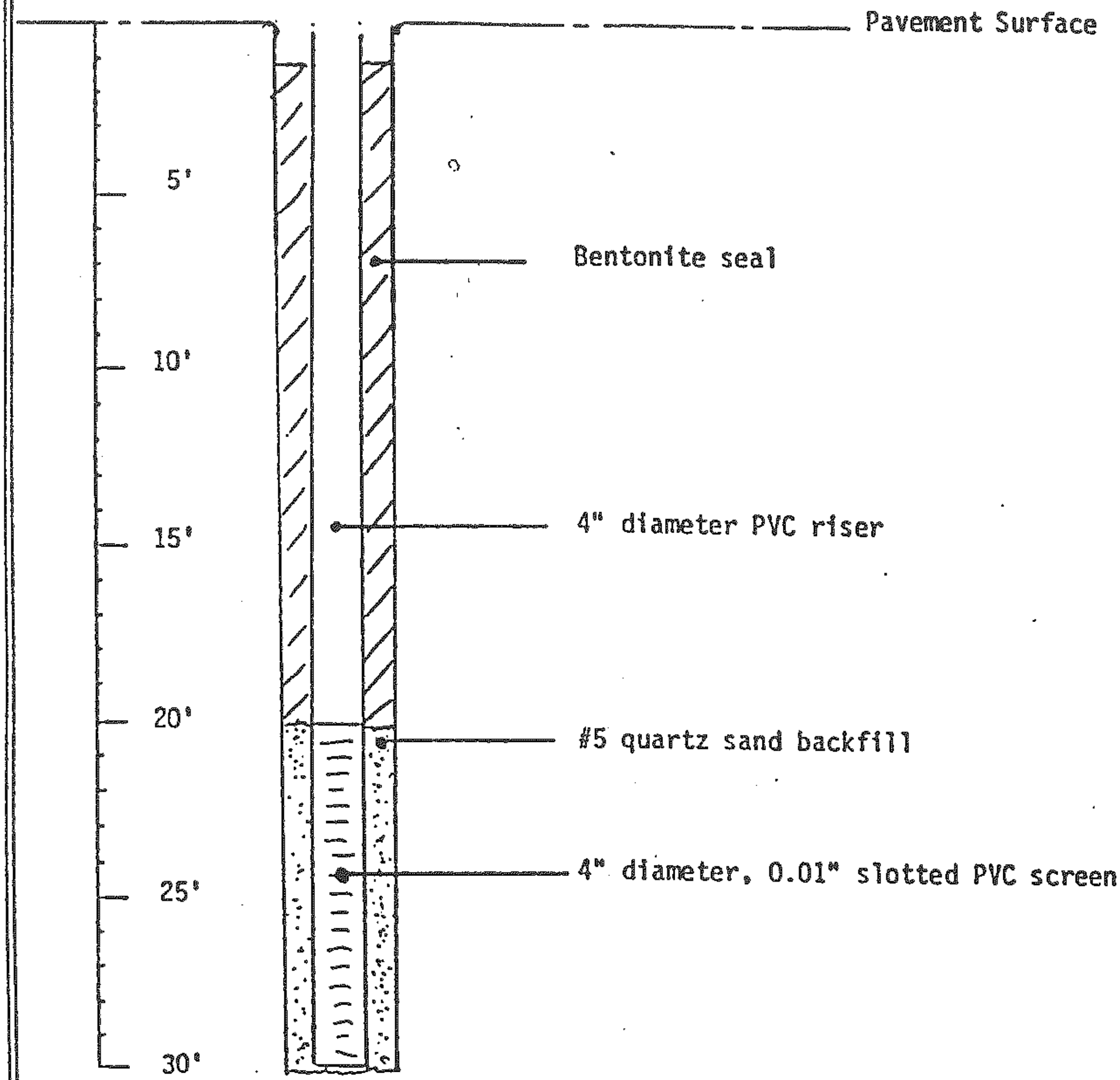
REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

Figure 2

OBSERVATION WELL DETAIL C

Typical for Boring Numbers
P1A and P7A



PROJECT NAME		
Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	Vertical Scale 1"=5'	
	PROJECT NO. 411-35023	DATE October 25, 1983

Figure 2

CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

PROJECT Observation Well Job # 8954

JOB NO. 411-35023 Boring No: P2

LOCATION A. C. Spark Plug Division

Flint, Michigan

* New Well installed (see below)

Boring Logs revised on 10-26-83 DATE 9-15-83

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
		0'5"	Gravel						
	1–9	9'0"	Sandy CLAY, brown, moist						
	10	10'0"	Fine SAND with some silt, brown, moist						
	11–13	13'0"	Fine SAND with some silt, brown, wet						
	14–16	16'0"	Clayey SILT, gray, moist						
	17–24	24'0"	SILT, grey, wet						
	25		Medium SAND, brown, wet						

TYPE OF SAMPLE
D - DISTURBED
UL - UNDIST. LINER
ST - SHELBY TUBE
SS - SPLIT SPOON
RC - ROCK CORE
( ) - PENETROMETER

REMARKS:
Groundwater encountered at 10'0" and at 16'0".

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

GROUND SURFACE ELEVATION
764.94

Figure 3

JOB NO. 411-35023 Boring No: P2 LOCATION A. C. Spark Plug Division

DATE 9-15-83 Flint, Michigan

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	26								
	27								
	28		Medium SAND, brown, wet						
	29								
	30	30'0"							
			End of Boring						
		NOTE:	* New well installed in bore hole during period from 10-17-83 thru 10-24-83. See detail A in report dated 10-26-83 for typical profile of the well installed at this location.						

TYPE OF SAMPLE
D - DISTURBED
UL UNDIST. LINER
ST - SHELBY TUBE
SS - SPLIT SPOON
RC - ROCK CORE
( ) - PENETROMETER

REMARKS:

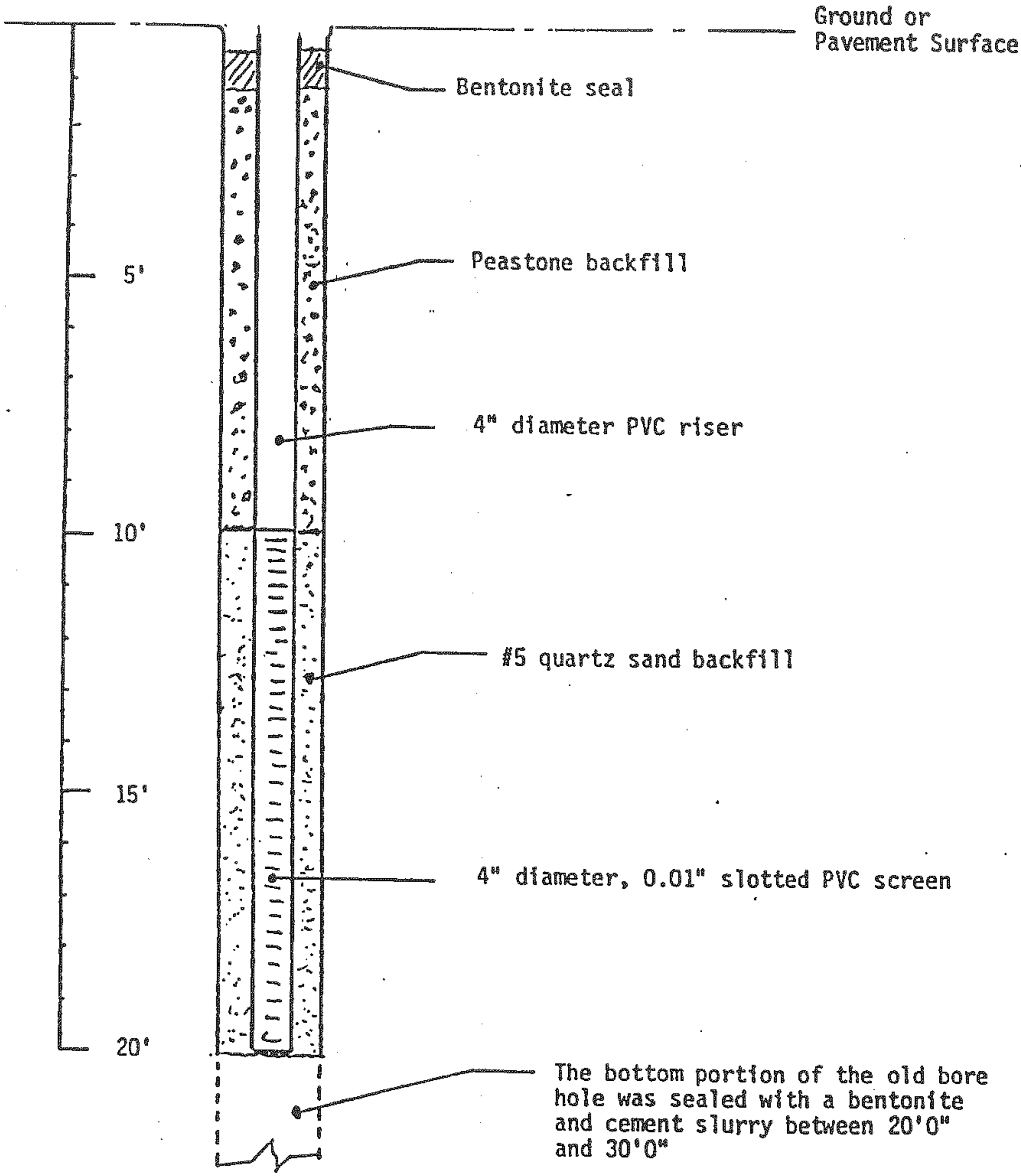
Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

Figure 3

Professional Service Industries

OBSERVATION WELL DETAIL A

Typical for Boring Numbers.
P2, P5, P6 and P7



PROJECT NAME		
Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	Vertical Scale 1"=3'	
	PROJECT NO. 411-35023	DATE October 25, 1983

Figure 3

CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

PROJECT Observation Well Job #8954

JOB NO. 411-35023 Boring No: P3

LOCATION A.C. Spark Plug Division

Flint, Michigan

* New Well installed (see below)
Boring Logs revised on 10-26-83 DATE 9-14-83

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
		0'4"	Gravel						
	1								
	2								
	3								
	4		Sandy CLAY, brown, moist						
	5								
	6								
	7								
	8	8'0"							
	9								
	10		Fine SAND with some silt, brown, moist						
	11	11'0"							
	12		SILT, grey, moist						
	13	13'0"							
	14								
	15								
	16		SILT, grey, wet						
	17								
	18								
	19	19'0"							
	20								
	21								
	22		Medium SAND, brown, wet						
	23								
	24								
	25								

TYPE OF SAMPLE
D - DISTURBED
U L UNDIST. LINER
S T - SHELBY TUBE
S S - SPLIT SPOON
R C - ROCK CORE
( ) - PENETROMETER

REMARKS:
Groundwater encountered at 8'0" and at 13'0".

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

GROUND SURFACE ELEV - 762.06

Figure 4

TE

JOB NO. 411-35023 Boring No: P3

DATE 9-14-83

PROJECT Observation Well Job #8954

LOCATION A.C. Spark Plug Division

Flint, Michigan

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength P.S.F.	Str. %
	26								
	27								
	28		Medium SAND, brown, wet						
	29								
	30	30'0"							
			End of Boring						
		NOTE:	* New well installed in bore hole during period from 10-17-83 to 10-24-83. See detail B in report dated 10-26-83 for typical profile of the well installed at this location.						

TYPE OF SAMPLE
D - DISTURBED
U L - UNDIST. LINER
S T - SHELBY TUBE
S S - SPLIT SPOON
R C - ROCK CORE
( ) - PENETROMETER

REMARKS:

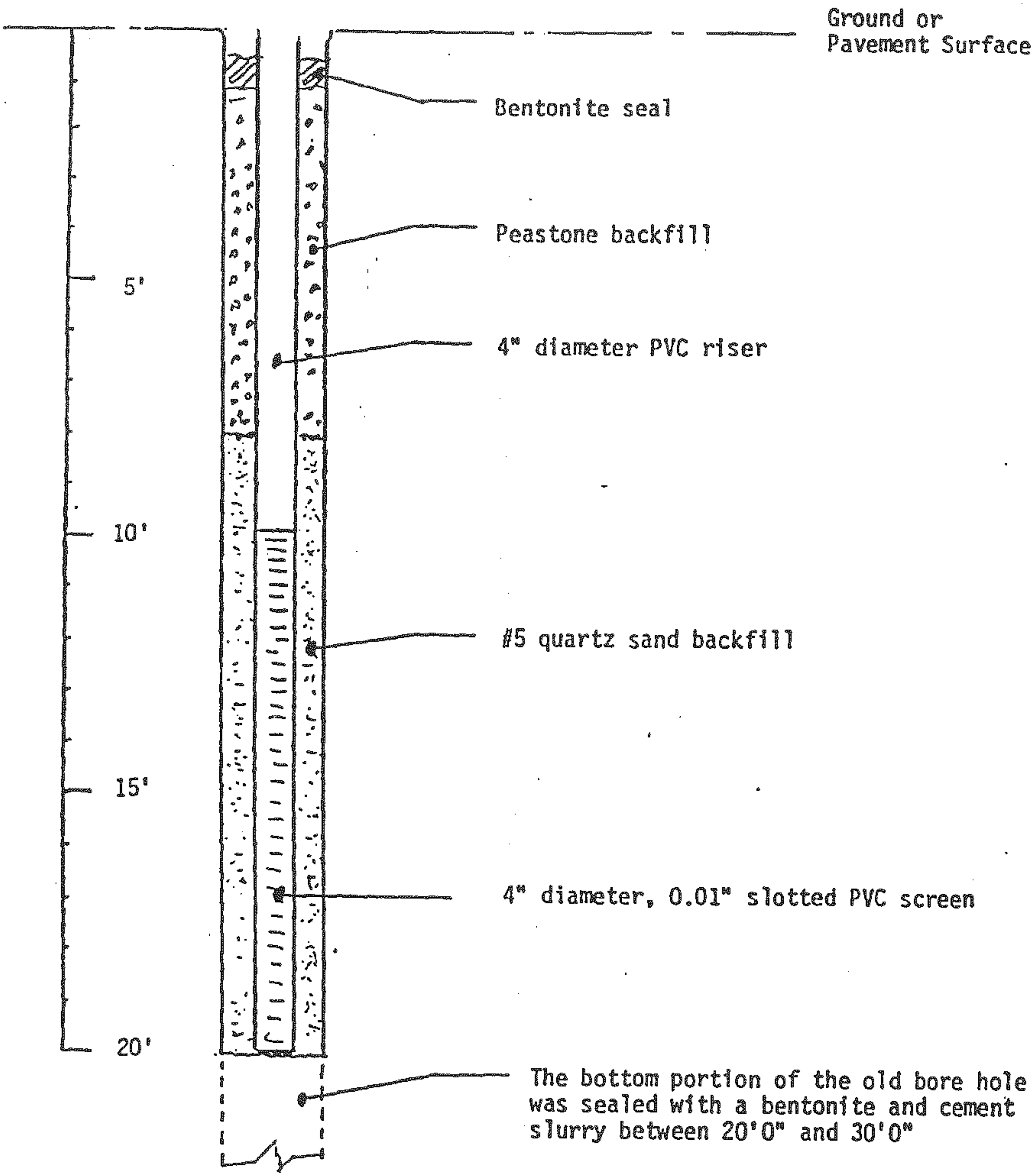
Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

Figure 4

Professional Service Industries

OBSERVATION WELL DETAIL B

Typical for Boring Numbers
P1, P3 and P4



PROJECT NAME		
Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	Vertical Scale 1"=3'	
	PROJECT NO. 411-35023	DATE October 25, 1983

Figure 4

CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

PROJECT Observation Well Job #8954

JOB NO. 411-35023 Boring No: P4

LOCATION A. C. Spark Plug Division

Flint, MI

* New Well installed (see below)
Boring Logs revised on 10-26-83 DATE 9-14-83

Sample Type	Depth	Legend	Soil Description	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
		0'10"	Concrete						
	1	1'0"	Gravel						
	2–6	6'0"	Sandy CLAY, brown, moist						
	7–10	10'0"	Fine SAND with some silt, brown, moist						
	11–12	12'0"	Fine SAND with some silt, brown, wet						
	13–15	15'6"	Clayey SILT, grey, moist						
	16–25	25'0"	SILT, grey, wet						
			Medium SAND, brown, wet						

TYPE OF SAMPLE
D - DISTURBED
UL - UNDIST. LINER
ST - SHELBY TUBE
SS - SPLIT SPOON
RC - ROCK CORE
P - PENETROMETER

REMARKS:
Groundwater encountered at 10'0"

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30", Count Made At 6" Intervals

G S Elev
762.83

Figure 5

CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

PROJECT Observation Well Job #8954

JOB NO. 411-35023 Boring No: P4

LOCATION A.C. Spark Plug Division
Flint, MI

DATE 9-14-83

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	26								
	27								
	28		Medium SAND, brown, wet						
	29								
	30	30'0"							
			End of Boring						
		NOTE:	* New well installed in bore hole during period from 10-17-83 to 10-24-83 See detail B in report dated 10-26-83 for typical profile of the well installed at this location.						

TYPE OF SAMPLE
D - DISTURBED
UL UNDIST. LINER
ST - SHELBY TUBE
SS SPLIT SPOON
RC - ROCK CORE
. : PENETROMETER

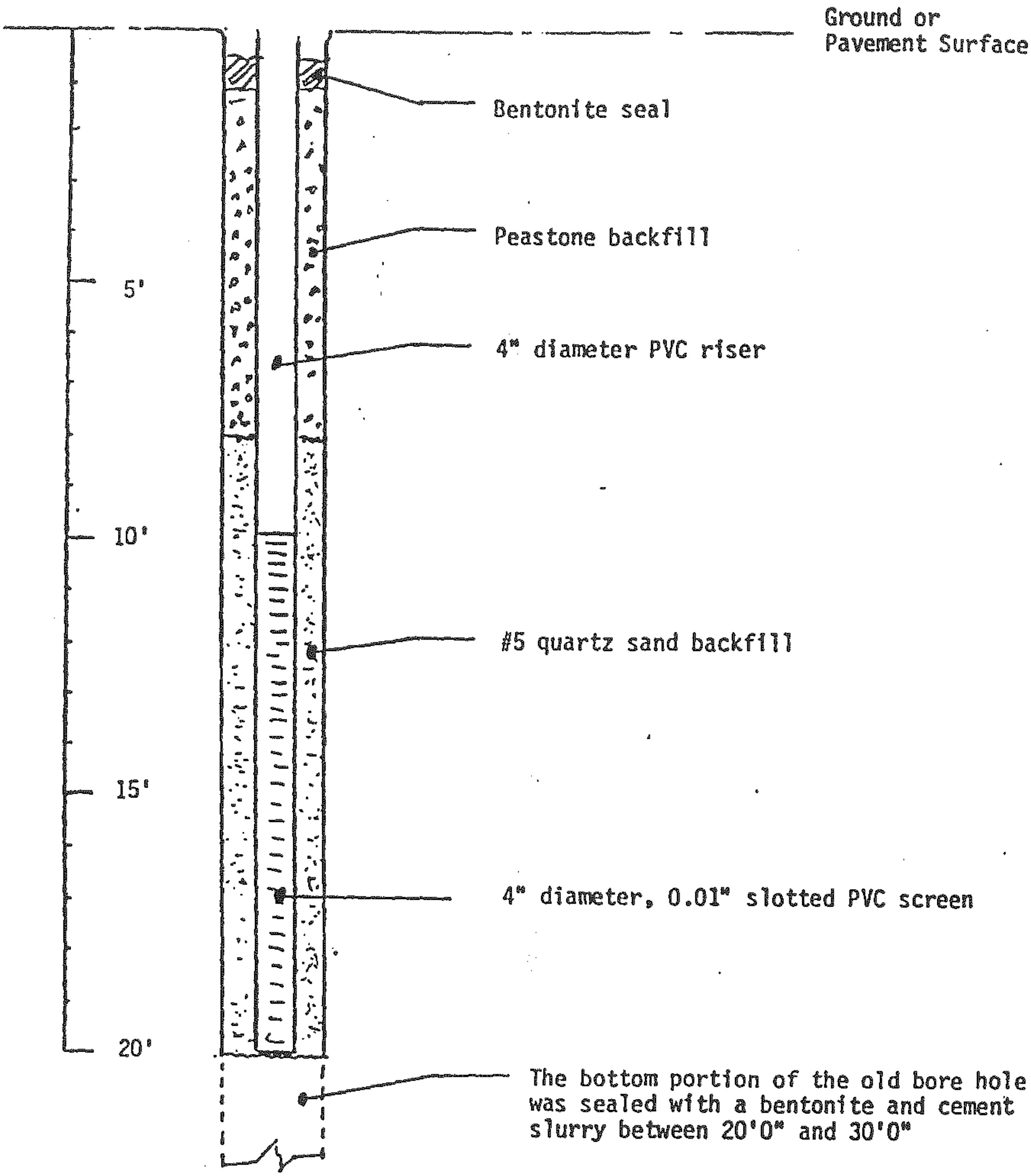
REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30". Count Made At 6" Intervals

Figure 5

OBSERVATION WELL DETAIL B

Typical for Boring Numbers
P1, P3 and P4



PROJECT NAME		
Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	Vertical Scale 1"=3'	
	PROJECT NO. 411-35023	DATE October 25, 1983

Figure 5

MICHIGAN TESTING ENGINEERS, INC.
CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

PROJECT Observation Well Job #8954

JOB NO. 411-35023 Boring No: P5

LOCATION A. C. Spark Plug Division
Flint, Michigan

* New Well installed (see below)
Boring Logs revised on 10-26-83

DATE 9-15-83

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
		0'5"	Gravel						
	1								
	2								
	3								
	4								
	5								
	6		Medium SAND, brown, moist						
	7								
	8								
	9								
	10								
	11								
	12	12'0"							
	13								
	14								
	15		Fine SAND, brown, wet						
	16								
	17	17'0"							
	18		Concrete Slab						
	19	19'0"							
	20								
	21								
	22								
	23		SILT, gray, wet						
	24								
	25								

TYPE OF SAMPLE
D - DISTURBED
U L UNDIST. LINER
S T - SHELBY TUBE
S S - SPLIT SPOON
R C - ROCK CORE

REMARKS:
Groundwater encountered at 12'0" and at 19'0".

Standard Penetration Test — Driving 2" OD Sampler 1' With

GS @ 82
763.56 Figure 6

CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

JOB NO. 411-35023 Boring No: P5

DATE 9-15-83

PROJECT Observation Well Job #8954

LOCATION A. C. Spark Plug Division

Flint, MI

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	26	26'0"	SILT, gray, wet						
	27								
	28		Medium SAND, brown, wet						
	29								
	30	30'0"							
			End of Boring						
		NOTE:	* New well installed in bore hole during period from 10-17-83 to 10-24-83. See detail A in report dated 10-26-83 for typical profile of the well installed at this location.						

TYPE OF SAMPLE
D - DISTURBED
U - UNDIST. LINER
ST - SHELBY TUBE
SS - SPLIT SPOON
RC - ROCK CORE
P - PENETROMETER

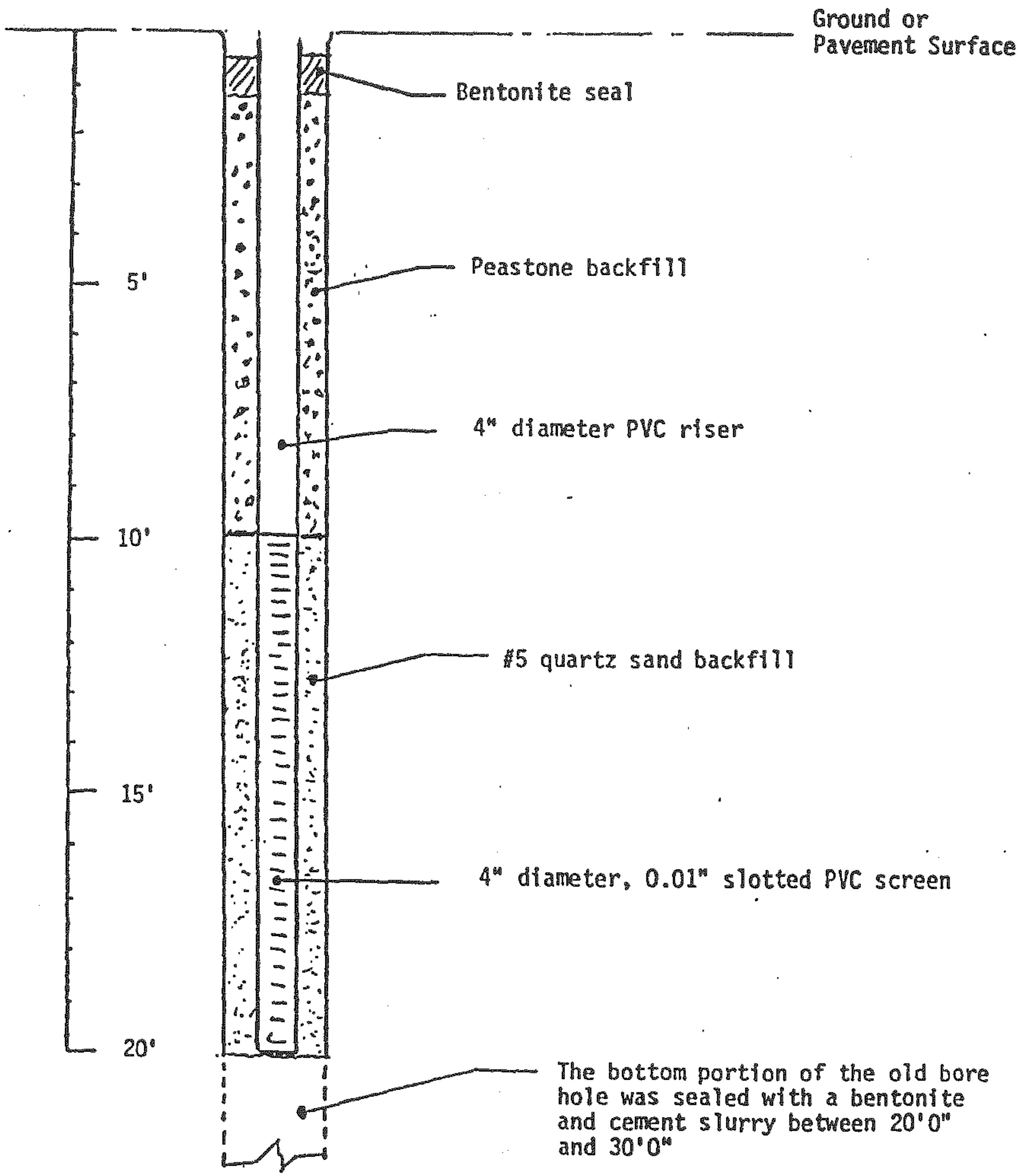
REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

Figure 6

OBSERVATION WELL DETAIL A

Typical for Boring Numbers.
P2, P5, P6 and P7



PROJECT NAME		
Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	Vertical Scale 1"=3'	
	PROJECT NO. 411-35023	DATE October 25, 1983

Figure 6

TEI

PROJECT Observation Well Job #8954

JOB NO. 411-35023 Boring No: P6

LOCATION A. C. Spark Plug Division

Flint, Michigan

* New Well installed (see below)
Boring Logs revised on 10-26-83 DATE 9-15-83

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
		0'5"	Stones						
	1–8	8'0"	Sandy CLAY, brown, moist						
	9–11	11'0"	Medium SAND, brown, moist						
	12–15	15'0"	Fine SAND, brown, wet						
	16–25	25'0"	SILT, grey, wet						
			Medium SAND, brown, wet						

TYPE OF SAMPLE
- DISTURBED
UL - UNDIST. LINER
ST. - SHELBY TUBE
SS. - SPLIT SPOON
RC. - ROCK CORE
( ) - PENETROMETER

REMARKS:
Groundwater encountered at 11'0".

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

G S @ ELEV
763.61

Figure 7

TE

... & FOUNDATIONS

PROJECT Observation Well Job #8954

JOB NO. 411-35023 Boring No: P6

LOCATION A. C. Spark Plug Division

Flint, Michigan

DATE 9-15-83

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	26								
	27								
	28		Medium SAND, brown, wet						
	29								
	30	30'0"							
			End of Boring						
		NOTE:	* New well installed in bore hole during period from 10-17-83 to 10-24-83. See detail A in report dated 10-26-83 for typical profile of the well installed at this location.						

TYPE OF SAMPLE
D - DISTURBED
U L - UNDIST LINER
S T - SHELBY TUBE
S S - SPLIT SPOON
R C - ROCK CORE
( ) - PENETROMETER

REMARKS:

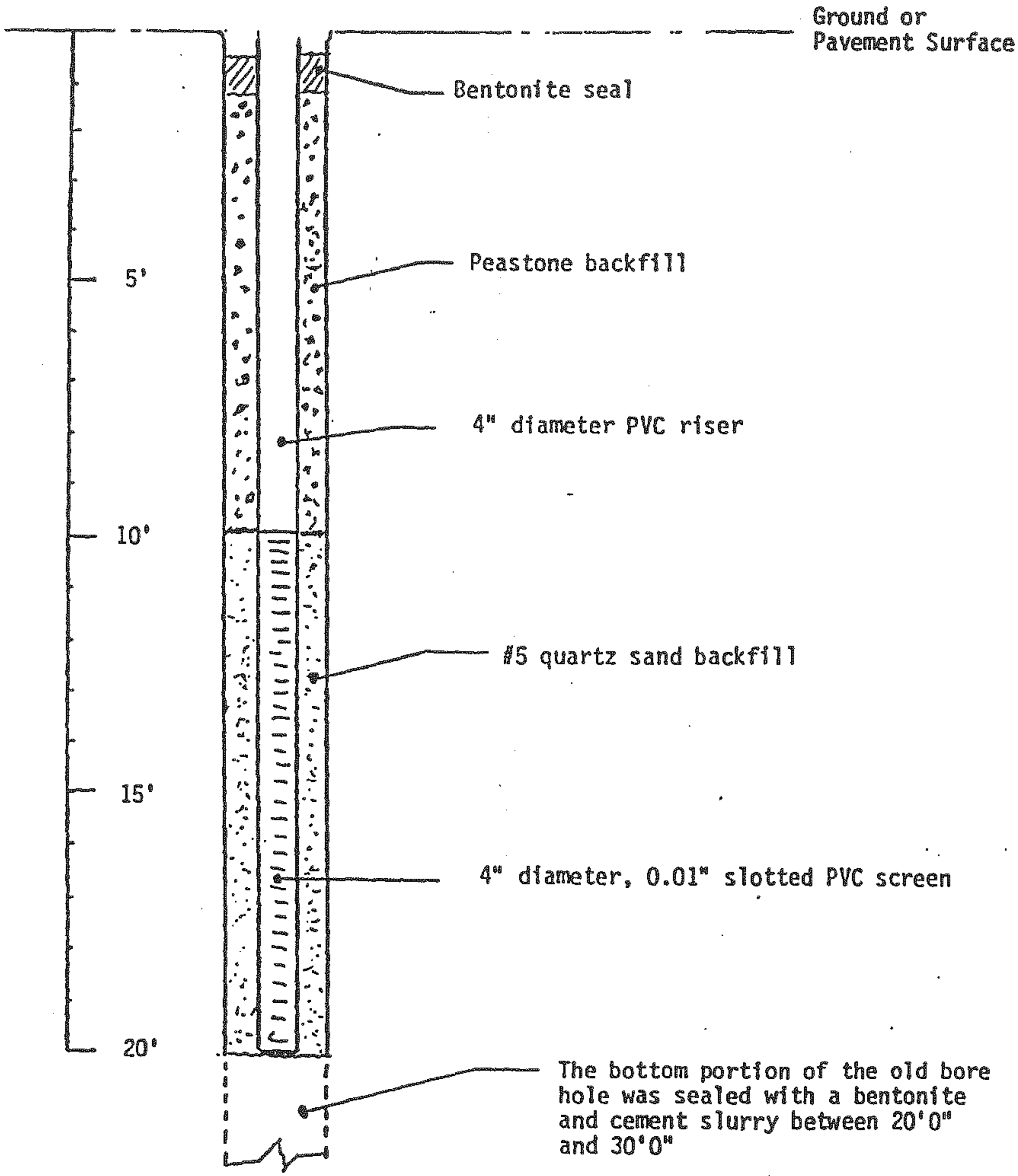
Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30", Count Made At 6" Intervals

Figure 7

Professional Service Industries

OBSERVATION WELL DETAIL A

Typical for Boring Numbers.
P2, P5, P6 and P7



PROJECT NAME	Vertical Scale 1"=3'	
Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	PROJECT NO. 411-35023	DATE October 25, 1983

Figure 7

PROJECT Observation Well Job #8954

LOCATION A. C. Spark Plug Division

Flint, Michigan

JOB NO. 411-35023 Boring No: P7

* New Well installed (see below)
Boring Logs revised on 10-26-83 . DATE 9-13-83

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	1	0'8½"	Concrete						
	2		SAND, brown, moist						
	3	3'0"							
	4								
	5								
	6								
	7		Silty CLAY, brown, moist						
	8								
	9								
	10								
	11	11'6"							
	12								
	13								
	14		Fine SAND, brown, wet with gasoline odor						
	15	15'0"							
	16								
	17								
	18								
	19								
	20		SILT, grey, wet						
	21								
	22								
	23								
	24								
	25								

TYPE OF SAMPLE
D - DISTURBED
UL - UNDIST. LINER
T - SHELBY TUBE
S - SPLIT SPOON
C - ROCK CORE
( ) - PENETROMETER

REMARKS:
Groundwater encountered at 11'6".

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

GSCBL

763.00 Figure 8

TE ... IN SOILS & FOUNDATIONS

JOB NO. 411-35023 Boring No: P7

DATE 9-13-83

PROJECT Observation Well Job #8954

LOCATION A. C. Spark Plug Division

Flint, Michigan

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	26								
	27	27'0"	SILT, grey, wet						
	28		Medium SAND, brown, wet						
	29								
	30	30'0"							
			End of Boring						
		NOTE:	* New well installed in bore hole during period from 10-17-83 to 10-24-83. See detail A in report dated 10-26-83 for typical profile of the well installed at this location.						

TYPE OF SAMPLE
D - DISTURBED
U.L - UNDIST. LINER
S T - SHELBY TUBE
S S - SPLIT SPOON
R C. - ROCK CORE
( ) - PENETROMETER

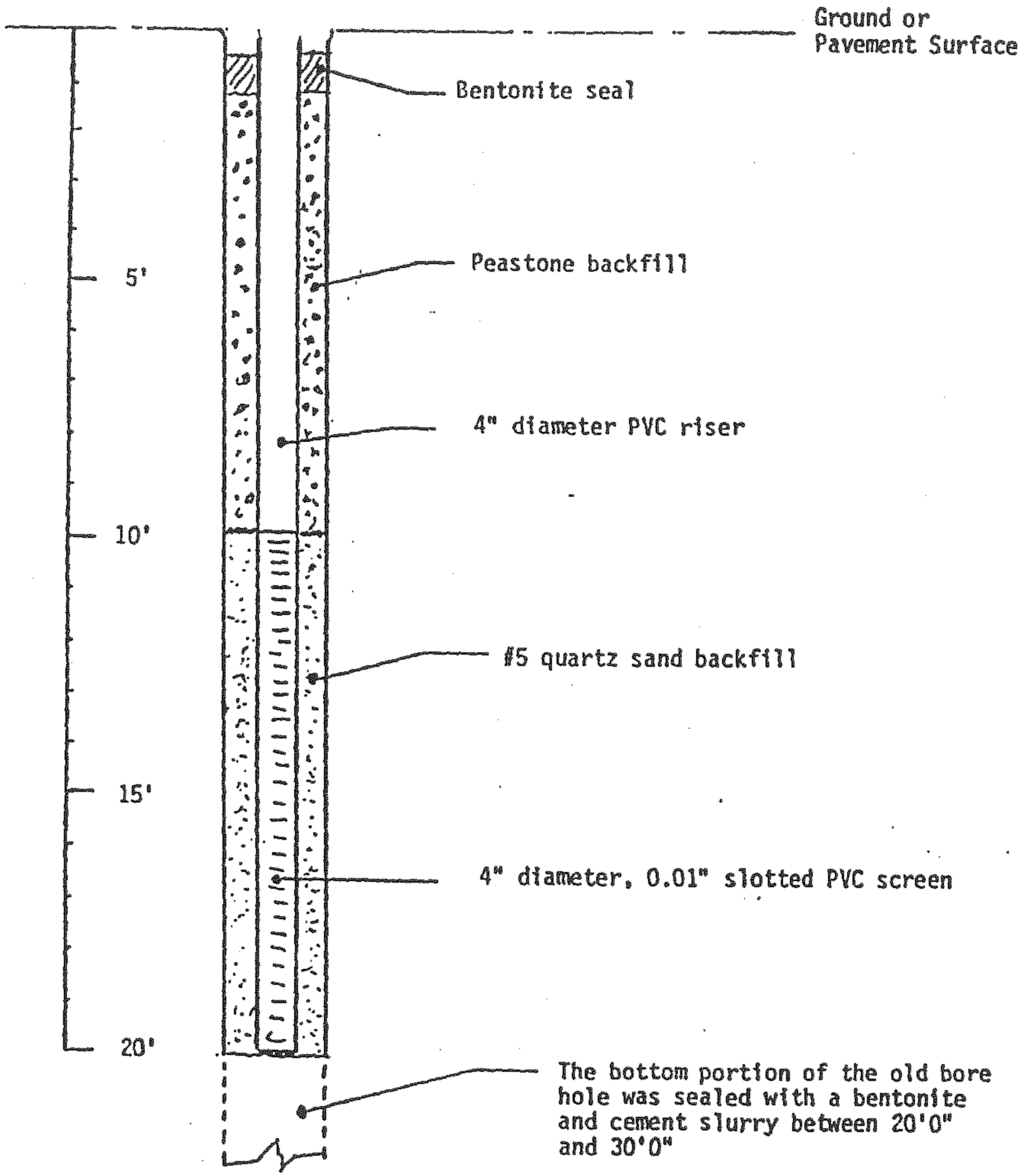
REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

Figure 8

OBSERVATION WELL DETAIL A

Typical for Boring Numbers.
P2, P5, P6 and P7



PROJECT NAME		
Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	Vertical Scale 1"=3'	
	PROJECT NO. 411-35023	DATE October 25, 1983

Figure 8

STE

JOB NO. 411-35023 Boring No: P7A

PROJECT Observation Well Job #8954
8' east of P7

LOCATION A.C. Spark Plug
Flint, Michigan

DATE 10-18-83

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	1	0'8"	Concrete						
	2		SAND, brown, moist						
	3	3'0"							
	4								
	5								
	6								
	7		Silty CLAY, brown, moist						
	8								
	9								
	10								
	11								
	12	12'0"							
	13								
	14		Clayey SILT, gray, moist, stiff	5					
1SS	15			6 7					
	16	16'6"							
	17								
	18								
	19			3					
2SS	20		SILT, gray, wet, medium dense	2 6					
	21								
	22								
	23								
	24			3					
3SS	25			4 5					

TYPE OF SAMPLE
D. - DISTURBED
U.L. UNDIST. LINER
S.T. - SHELBY TUBE
S.S. - SPLIT SPOON
R.C. - ROCK CORE
( ) - PENETROMETER

REMARKS:
Groundwater encountered at 16'6".

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30", Count Made At 6" Intervals

GS @ EL
763.00

Figure 9

MICHIGAN TESTING ENGINEERS, INC.
CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

JOB NO. 411-35023 Boring No: P7A

PROJECT Observation Well Job #8954

8' east of P7

LOCATION A.C. Spark Plug

Flint, Michigan

DATE 10-18-83

Sample No.	Depth	Legend	Soil Description	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength P.S.F.	Str. %
	26								
	27		SILT, gray, wet, medium dense						
	28								
	29	29'0"							
4SS	30			8 10 16					
	31								
	32								
	33								
	34								
5SS	35			8 16 18					
	36								
	37		Fine SAND, brown, wet, very dense						
	38								
	39								
6SS	40			23 35 50					
	41								
	42								
	43	43'0"							
	44								
7SS	45			9 13 25					
	46		Coarse SAND, brown, wet, very dense						
	47								
	48								
	49	49'0"							
8SS	50		Silty SAND, brown, wet, very dense	9 16 23					
	51								

TYPE OF SAMPLE
D - DISTURBED
U L - UNDIST. LINER
S T. - SHELBY TUBE
S S. - SPLIT SPOON
R C. - ROCK CORE
( ) - PENETROMETER

REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

Figure 9

CONSULTING ENGINEERS IN SOILS & FOUNDATIONS

JOB NO. 411-35023 Boring No: P7A

PROJECT Observation Well Job #8954

LOCATION 8' east of P7 A.C. Spark Plug Flint, Michigan

DATE 10-18-83

Sample	Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
		52	52'0"	Silty SAND, brown, wet, very dense						
		53–62	62'0"	SILT, gray, wet, very dense						
9	SS	55			24 / 55 / --					
10	SS	60			10 / 20 / 39					
		63–65	65'0"	CLAY with a trace of fine gravel, gray, moist, hard						
11	SS	65			34 / 60 / --					
				End of Boring						

NOTE: Observation well installed in bore hole on the date indicated above. See Detail C in report dated 10-26-83 for typical profile of the well installed at this location.

TYPE OF SAMPLE
D - DISTURBED
U.L. - UNDIST. LINER
S.T. - SHELBY TUBE
S.S. - SPLIT SPOON
R.C. - ROCK CORE
( ) - PENETROMETER

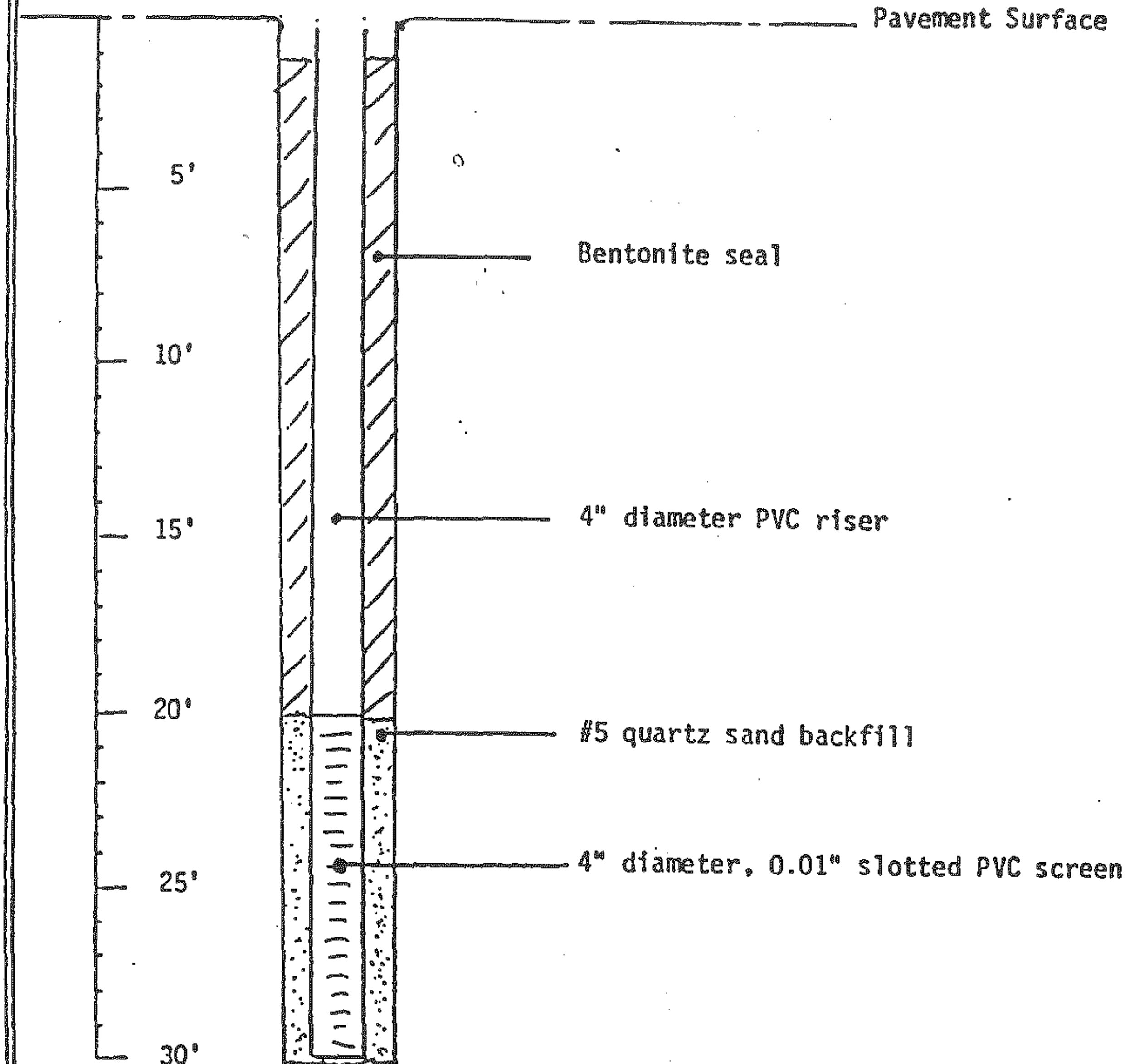
REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1' With 140# Hammer Falling 30", Count Made At 6" Intervals

Figure 9

OBSERVATION WELL DETAIL C

Typical for Boring Numbers
P1A and P7A



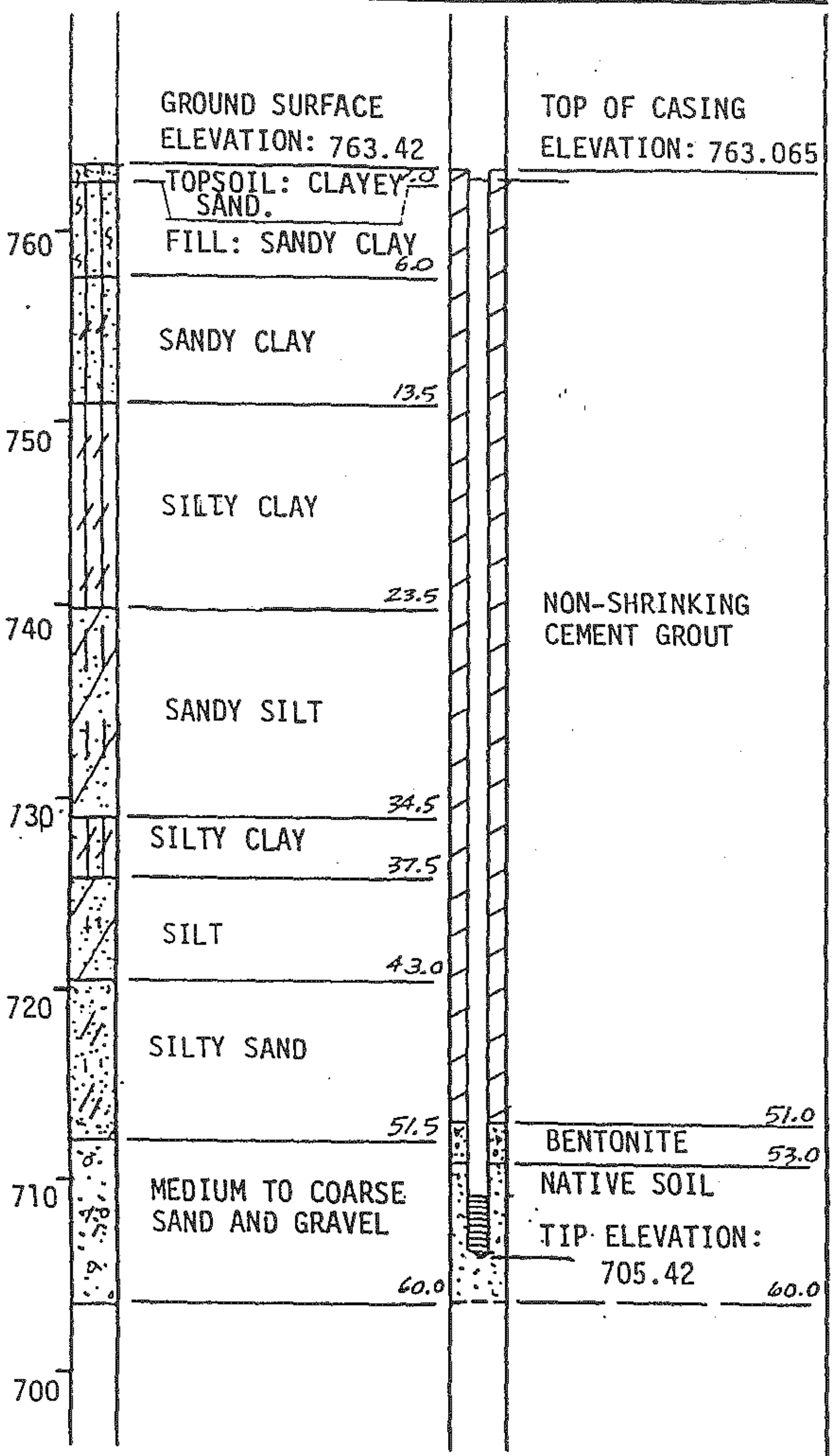
PROJECT NAME Observation Well Installation Tank Farm Area A.C. Spark Plug Division Flint, Michigan	Vertical Scale 1"=5'	
	PROJECT NO. 411-35023	DATE October 25, 1983

Figure 9

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	745.425	
4/10/84	745.025	
3/31/84	744.875	
3/19/84	744.725	
3/6/84	744.465	

CASING – DIAMETER: 2"
– LENGTH: 54.5'
– MATERIAL: Galvanized

SCREEN – DIAMETER: 2"
– LENGTH: 3.0'
– MESH: #10 Slot
– MATERIAL: Stainless Steel

WELL STARTED: 2/24/84
WELL COMPLETED: 2/24/84
INSPECTOR: K. Deddeh
DRILLER: J. Blank
CONTRACTOR: American Drilling Co.
EQUIPMENT: CME-75

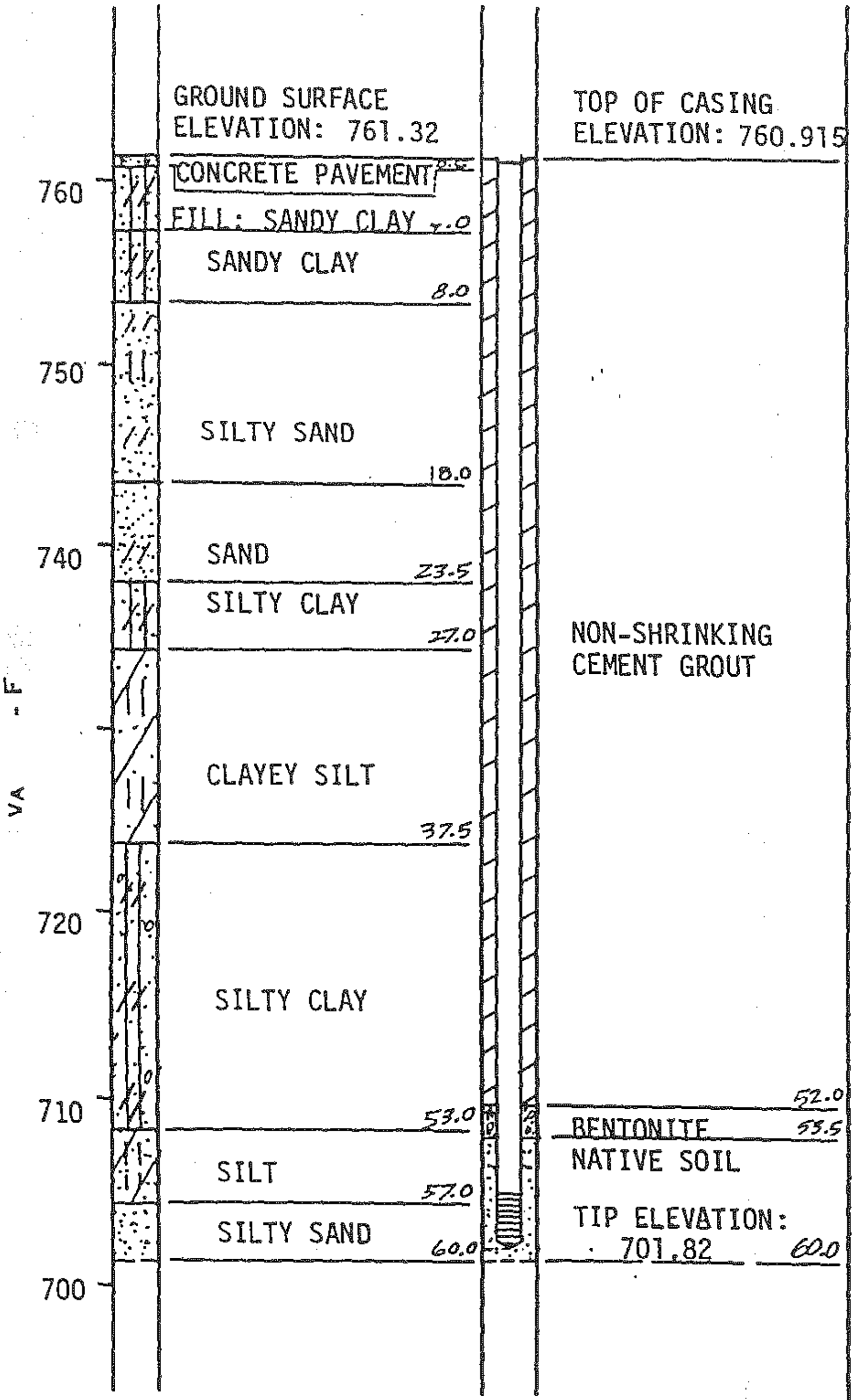
NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38000 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL No. P-8

GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: DZH	DATE: 3/20/84
PROJECT NO: 84043	FIGURE NO: 10

LOG OF GROUNDWATER MONITORING WELL	
CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD.	
GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	744.525	
4/10/84	744.425	
3/31/84	744.275	
3/19/84	744.365	
3/6/84	743.965	

CASING – DIAMETER: 2"
– LENGTH: 56.5'
– MATERIAL: Galvanized

SCREEN – DIAMETER: 2"
– LENGTH: 3'
– MESH: #10 Slot
– MATERIAL: Stainless Steel

WELL STARTED: 2/27/84
WELL COMPLETED: 2/29/84
INSPECTOR: K. Deddeh
DRILLER: H. Corbin
CONTRACTOR: American Drilling
EQUIPMENT: CME-75

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38955 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL NO. P-9

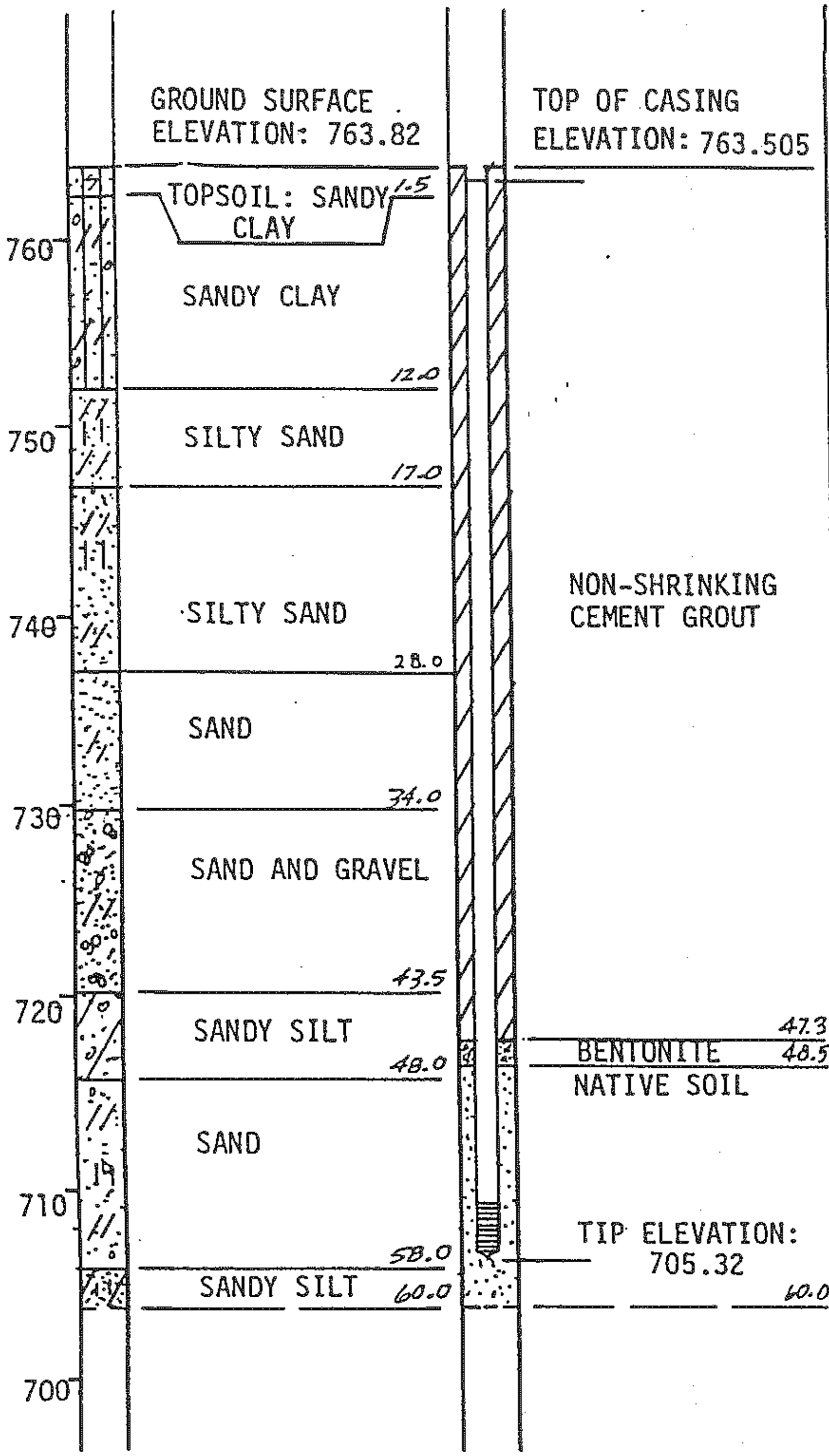
GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: [illegible]	DATE: 3/20/84
PROJECT NO: 84043	FIGURE NO: 11

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	744.925	
4/10/84	744.685	
3/31/84	744.555	
3/19/84	744.505	
3/6/84	744.425	

CASING – DIAMETER: 2"
– LENGTH: 55.5'
– MATERIAL: Galvanized

SCREEN – DIAMETER: 2"
– LENGTH: 3.0'
– MESH: #10 Slot
– MATERIAL: Stainless Stee

WELL STARTED: 2/29/84
WELL COMPLETED: 3/1/84
INSPECTOR: K. Deddeh
DRILLER: H. Corbin
CONTRACTOR: American Drilling
EQUIPMENT: CME-75

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38500 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL No. P-10

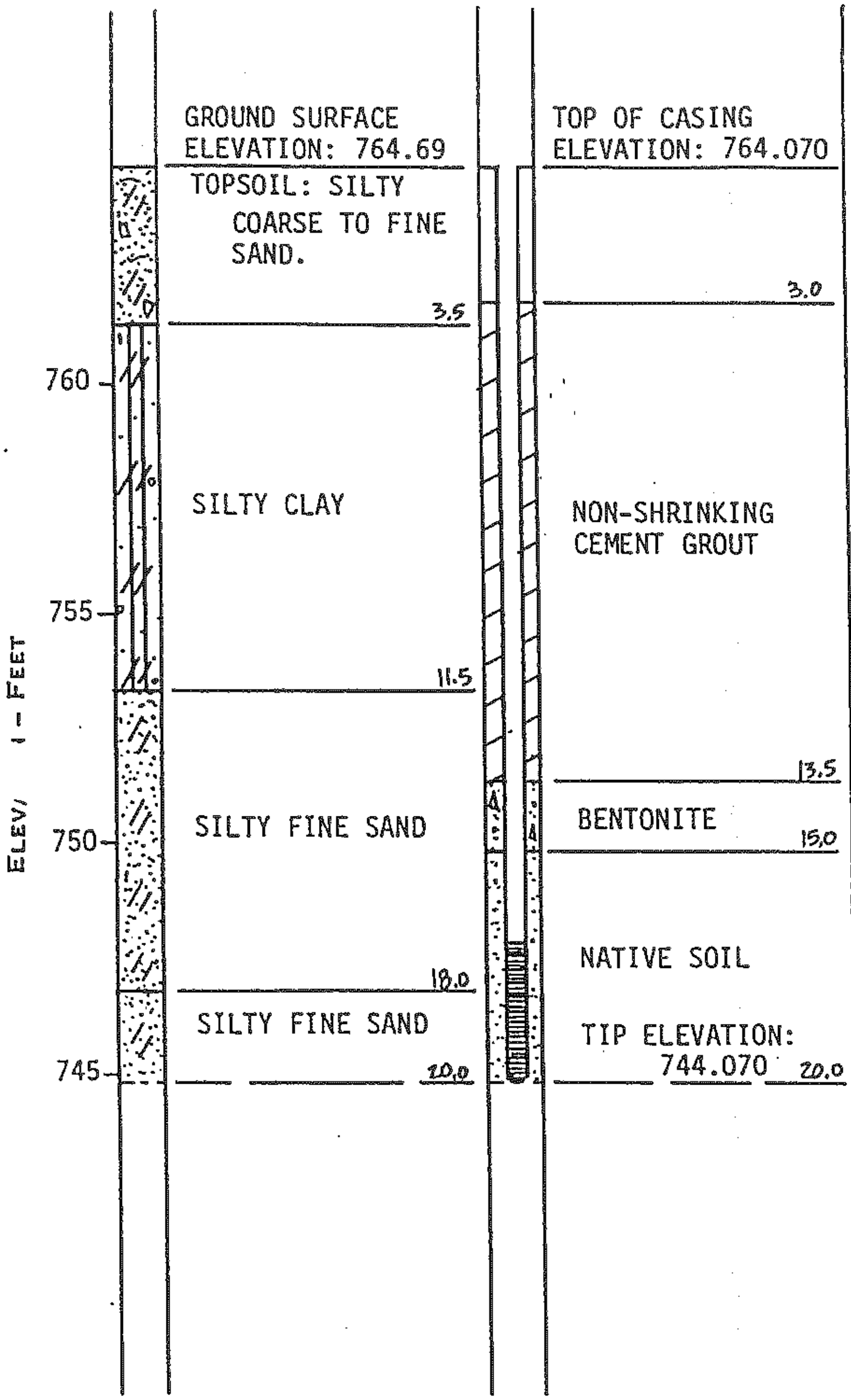
GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: [signature]	DATE: 3/20/84
PROJECT NO: 84043	FIGURE NO: 12

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	745.210	
4/10/84	744.950	
3/31/84	748.370	

CASING – DIAMETER: 2.0"
– LENGTH: 17.0'
– MATERIAL: Galvanized

SCREEN – DIAMETER: 2.0"
– LENGTH: 3.0'
– MESH: #10 Slot
– MATERIAL: Stainless Steel

WELL STARTED: 3/23/84
WELL COMPLETED: 3/23/84
INSPECTOR: T. Kline
DRILLER: J. Blank
CONTRACTOR: American Drilling
EQUIPMENT: CME-75

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38000 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL No. P-11S

GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

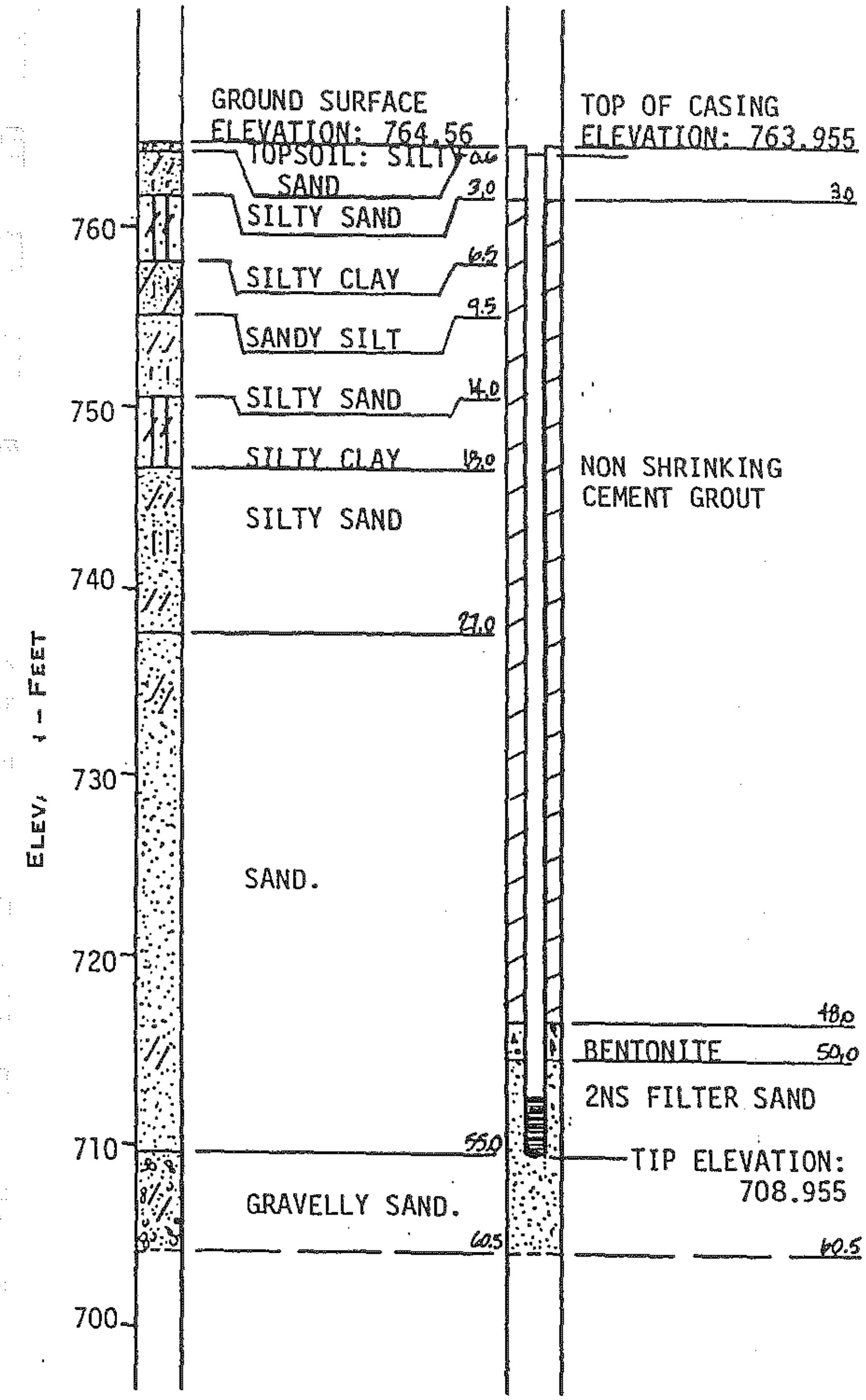
APPROVED BY: DKH	DATE: 5/7/84
PROJECT NO: 84043	FIGURE NO: 16

Figure 13

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	745.085	
4/10/84	744.835	
3/31/84	744.865	

CASING – DIAMETER: 2.0"
– LENGTH: 52.0'
– MATERIAL: Galvanized

SCREEN – DIAMETER: 2.0"
– LENGTH: 3'
– MESH: #10 Slot
– MATERIAL: Stainless Steel

WELL STARTED: 3/27/84
WELL COMPLETED: 3/27/84
INSPECTOR: M. Sweatman
DRILLER: J. Blank
CONTRACTOR: American Drilling
EQUIPMENT: CME-75

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38000 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL No. P-11D

GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: [signature] DATE: 5/7/84
PROJECT NO: 84043 FIGURE NO: 13

Figure 14

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC
GROUND SURFACE ELEVATION: 762.48	TOP OF CASING ELEVATION: 762.050
TOPSOIL: SILTY CLAY 1.0	3.0
SILTY CLAY	NON-SHRINKING CEMENT GROUT. 6.0
	BENTONITE. 7.2
10.0	NATIVE SOIL.
SILTY SAND	
15.0	TIP ELEVATION: 747.050 15.0

ELEV., I - FEET: 760, 755, 750, 745

GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	752.840	
4/10/84	752.220	

CASING - DIAMETER: 2.0"
- LENGTH: 12.0'
- MATERIAL: Galvanized

SCREEN - DIAMETER: 2.0"
- LENGTH: 3.0'
- MESH: #10 Slot
- MATERIAL: Stainless Steel

WELL STARTED: 3/31/84
WELL COMPLETED: 3/31/84
INSPECTOR: M. Sweatman
DRILLER: J. Blank
CONTRACTOR: American Drilling
EQUIPMENT: CME-75

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38000 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL NO. P-12S

GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

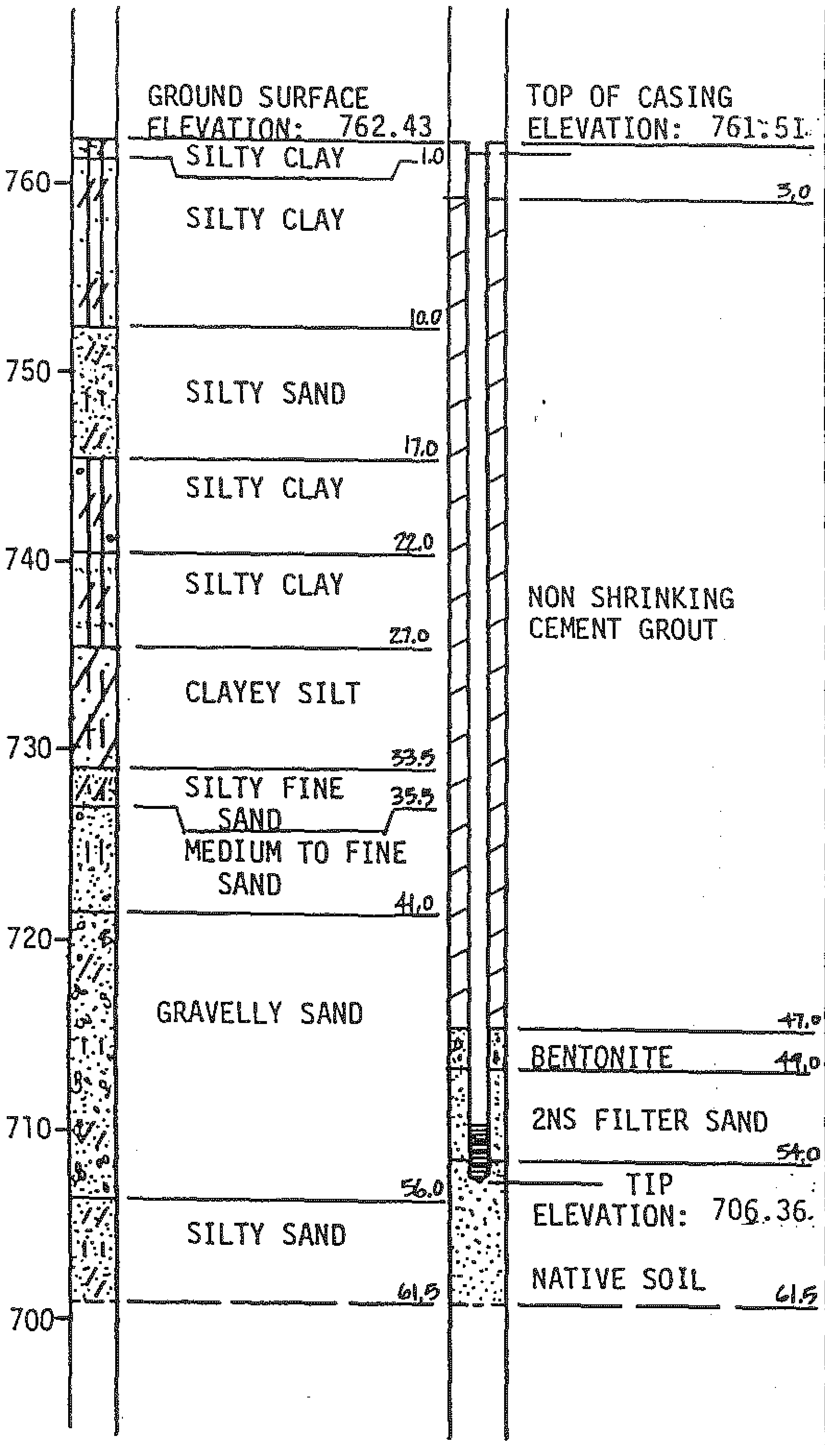
APPROVED BY: DLH	DATE: 5/7/84
PROJECT NO: 84043	FIGURE NO: 17

Figure 15

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	744.860	
4/10/84	744.830	

CASING – DIAMETER: 2.0"
– LENGTH: 52.0'
– MATERIAL: Galvanized

SCREEN – DIAMETER: 2.0"
– LENGTH: 3.0'
– MESH: #10 Slot
– MATERIAL: Stainless Steel

WELL STARTED: 3/31/84
WELL COMPLETED: 3/31/84
INSPECTOR: M. Sweatman
DRILLER: J. Blank
CONTRACTOR: American Drilling
EQUIPMENT: CME-75

NOTE: Top of casing elevation revised 6/17/87.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38000 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL No. P-12D

GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

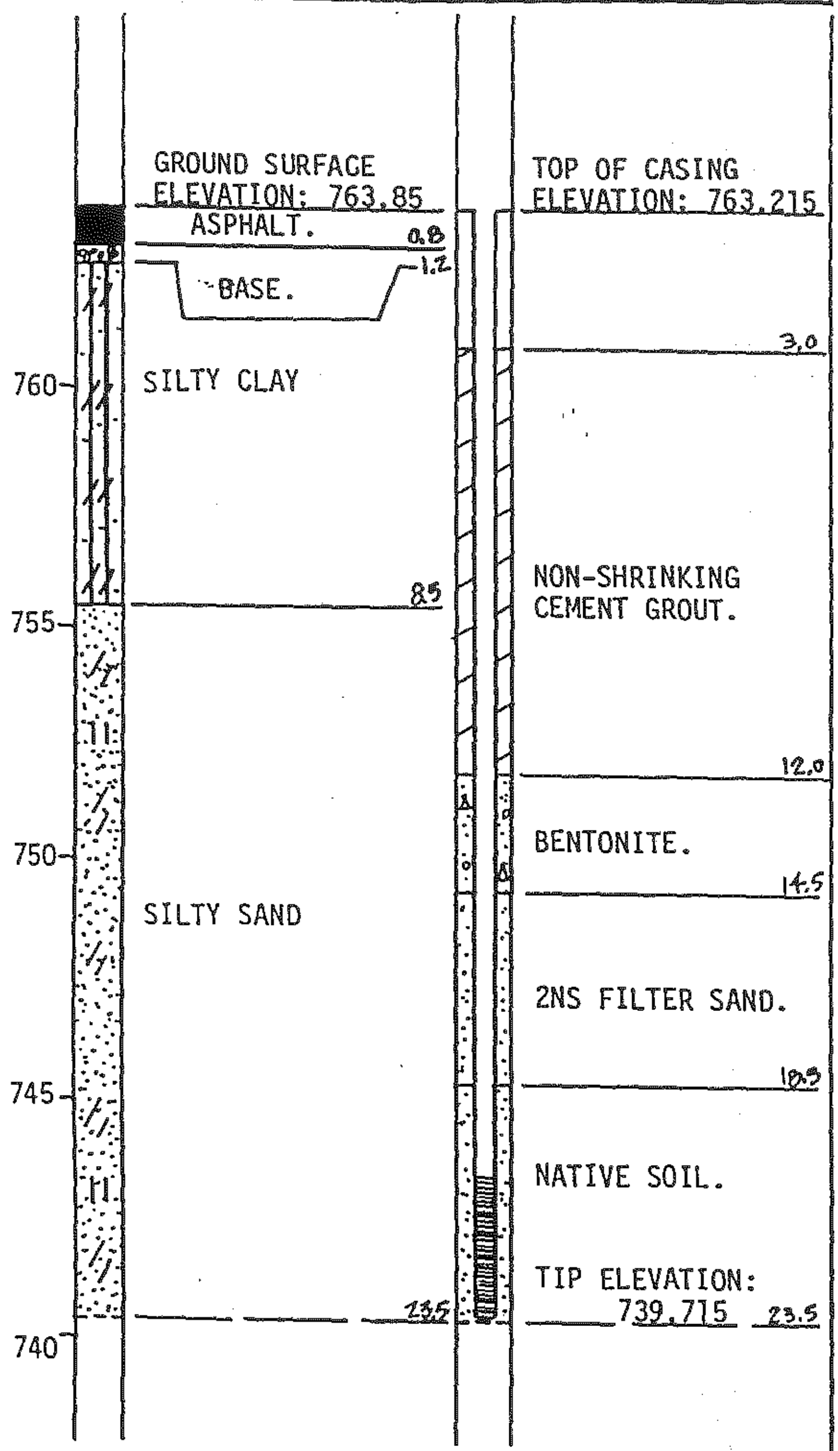
APPROVED BY: BLH	DATE: 5/7/84
PROJECT NO: 84043	FIGURE NO: 14

Figure 16

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	745.035	
4/10/84	744.795	
3/31/84	744.675	

CASING – DIAMETER: 2.0"
– LENGTH: 20.0'
– MATERIAL: Galvanized

SCREEN – DIAMETER: 2.0"
– LENGTH: 3.0'
– MESH: #10 Slot
– MATERIAL: Stainless Steel

WELL STARTED: 3/30/84
WELL COMPLETED: 3/30/84
INSPECTOR: M. Sweatman
DRILLER: J. Blank
CONTRACTOR: American Drilling
EQUIPMENT: CME-75

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38000 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL No. P-13S

GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

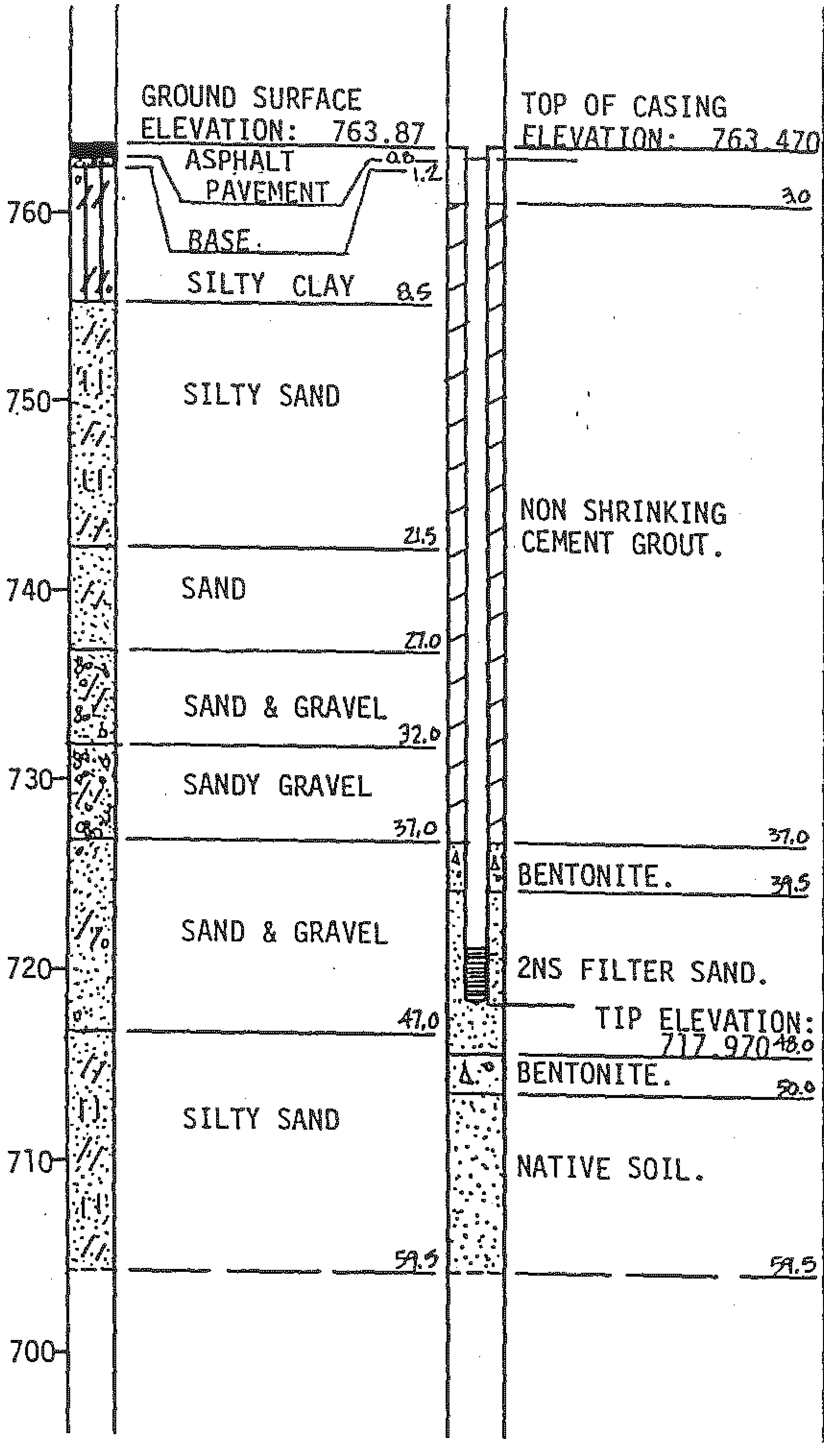
APPROVED BY: DLH	DATE: 5/7/84
PROJECT NO: 84043	FIGURE NO: 18

Figure 17

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
4/23/84	745.030	
4/10/84	744.850	
3/31/84	744.780	

CASING – DIAMETER: 2.0"
– LENGTH: 42.0'
– MATERIAL: Galvanized

SCREEN – DIAMETER: 2.0"
– LENGTH: 3.0'
– MESH: #10 Slot
– MATERIAL: Stainless Steel

WELL STARTED: 3/30/84
WELL COMPLETED: 3/30/84
INSPECTOR: M. Sweatman
DRILLER: J. Blank
CONTRACTOR: American Drilling
EQUIPMENT: CME-75

NOTE: Log revised 6/17/87

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
38000 TEN MILE RD., FARMINGTON HILLS, MI 48024

GROUNDWATER MONITORING WELL No. P-13D

GASOLINE-BENZENE CONTAMINATION STUDY
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY:	DATE: 5/7/84
PROJECT NO: 84043	FIGURE NO: 15

Figure 18

NEYER, TISEO & HINDO, LTD.

GENERAL NOTES

TERMINOLOGY

Unless otherwise noted, all terms utilized herein refer to the Standard Definitions presented in ASTM D 653.

PARTICLE SIZES

Boulders		-	Greater than 12 inches (305mm)
Cobbles		-	3 inches (76.2mm) to 12 inches (305mm)
Gravel - Coarse		-	3/4 inches (19.05mm) to 3 inches (76.2mm)
	Fine	-	No. 4 - 3/16 inches (4.75mm) to 3/4 inches (19.05mm)
Sand	Coarse	-	No. 10 (2.00mm) to No. 4 (4.75mm)
	Medium	-	No. 40 (0.425mm) to No. 10 (2.00mm)
	Fine	-	No. 200 (0.074mm) to No. 40 (0.425mm)
Silt		-	0.005mm to 0.074mm
Clay		-	Less than 0.005mm

COHESIONLESS SOILS

Classification

The major soil constituent is the principal noun, i.e. sand, silt, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituents (percent by weight)
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35% (clayey, silty, etc.)	Little - 12 to 23%
And - Over 35%	Some - 23 to 33%

Density Classification	Relative Density %	Approximate Range of (N)
Very Loose	0-15	0-4
Loose	16-35	5-10
Medium Compact	36-65	11-30
Compact	66-85	31-50
Very Compact	86-100	Over 50

Relative Density of Cohesionless Soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier; i.e., silty clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohensionless soils; i.e., silty clay, trace of sand, little gravel.

Consistency	Unconfined Compressive Strength (psf)	Appromixate Range of (N)
Very Soft	Below 500	0-2
Soft	500-1000	3-4
Medium	1000-2000	5-8
Stiff	2000-4000	9-15
Very Stiff	4000-8000	16-30
Hard	8000-16000	31-50
Very Hard	Over 16000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

SAMPLE DESIGNATIONS

AS - Auger Sample - Directly from auger flight.
BS - Miscellaneous Samples - Bottle or Bag.
S - Split Spoon Sample with Liner Insert - ASTM D 1586
LS - Liner Sample S with liner insert 3 inches in length.
ST - Shelby Tube Sample - 3 inch diameter unless otherwise noted.
PS - Piston Sample - 3 inch diameter unless otherwise noted.
RC - Rock Core - NX core unless otherwise noted.

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0" outside-diameter, 1-3/8" inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

LOG OF SUBSURFACE PROFILE

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION:
762.7

ELEVATION - FEET	DEPTH	DESCRIPTION	SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION RESISTANCE * (0 10 20 30 40)
	0.5	CONCRETE.					
	1.0	SAND AND GRAVEL BASE.					
760			LS-1	760.2	-	-	2-4-5
		Medium to Stiff Mottled Brown and Gray SILTY CLAY with Little Sand.	LS-2	757.7	-	-	3-5-6
755	8.0'		LS-3	755.2	-	-	2-5-5
	9.5'	Compact Brown SILTY FINE SAND.	LS-4	752.7	-	-	18-21-19
750	14.5	Very Stiff Gray SILTY CLAY with Little Sand.	LS-5	750.2	19.0	-	6-9-12
	15.5	Medium Gray SILT with Trace of Clay.	LS-6	747.7	-	-	2-3-4
745		Medium Compact Gray SILT with Trace of Sand.	LS-7	745.2	21.9	-	5-8-8
	20.0		LS-8	742.7	25.2	-	5-6-8
740							

NOTES:
1. Test boring drilled with 4 inch solid-stem augers to a depth of 3.5 feet, 3-1/2 inch diameter rotary wash below that depth.
2. No groundwater level information was obtained due to the use of drilling fluid.
3. Test boring fully grouted with non-shrinking cement grout.

TOTAL DEPTH:	20.0'
BORING STARTED:	2-25-85
BORING COMPLETED:	2-25-85
INSPECTOR:	B.L. Forslund
DRILLER:	W. Holloman
CONTRACTOR:	Canonie Construction

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH 0 FEET OF CASING IN PLACE.

* PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 12 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER 1

A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: BLF	DATE: 3-15-85
PROJECT No. 84043 OW	FIGURE No. 1

Figure 19

LOG OF SUBSURFACE PROFILE

CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION: 762.9

SOIL SAMPLE DATA

ELEVATION – FEET	Description	Depth	SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION RESISTANCE * (0 10 20 30 40)
	CONCRETE.	0.7'					
760	FILL: Medium Compact Brown Sand with Little Gravel, Trace of Clay.	4.0'	LS-1	760.4	-	-	10-10-1[illegible]
	Very Stiff Mottled Gray and Brown SILTY CLAY with Trace of Sand and Gravel.		LS-2	757.9	-	-	2-4-8
755		8.0'	LS-3	755.4	-	-	7-12-16
	Medium Compact to Compact Brown SILTY FINE SAND.		LS-4	752.9	20.8	-	5-11-[illegible]
750		12.4'	LS-5	750.4	-	-	15-31-35
	Compact Gray SANDY SILT.	13.5'					
	Very Stiff Gray SILTY CLAY with Occasional Silt Partings, Trace of Sand.	15.0'	LS-6	747.9	-	-	8-10-13
745	Medium Compact Gray SILT with Occasional Very Stiff Gray Silty Clay Seams.	18.0'	ST-1	745.9	25.6	98.4	PUSHED
	Loose Gray SANDY SILT.	20.0'	LS-7	742.9	23.4	-	4-5-4
740							

NOTES:
1. Test boring drilled with 4-inch solid-stem augers to a depth of 3.5 feet, 3-1/2 inch diameter rotary wash below that depth.
2. No groundwater level information was obtained due to the use of drilling fluid.
3. Test boring fully grouted with non-shrinking cement grout.

TOTAL DEPTH: 20.0'
BORING STARTED: 2-26-85
BORING COMPLETED: 2-26-85
INSPECTOR: B.L.Forslund
DRILLER: W. Holloman
CONTRACTOR: Canonie Construction

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH 0 FEET OF CASING IN PLACE.

* PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 12 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER 2

A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: BCF	DATE: 3-15-85
PROJECT NO. 84043 OW	FIGURE NO. 2

LOG OF SUBSURFACE PROFILE					
CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD. GROUND SURFACE ELEVATION: 763.1	SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION RESISTANCE * 0 10 20 30 40
CONCRETE. 0.8'					
FILL: Loose Brown SAND, Trace of Gravel, Occasional Clay Lenses.	LS-1	760.6	-	-	4-5-4
	S-1	758.1	-	-	2-2-3
8.0'	S-2	755.6	-	-	2-2-3
Compact to Very Compact Brown to Grayish Brown SILTY FINE SAND.	LS-2	753.1	-	-	4-11-12
13.0'	LS-3	750.6	20.1	-	17-29-39
Medium Compact Brown SILTY FINE SAND. 16.0'	S-3	748.1	-	-	3-5-7
Medium Compact to Compact Brown SILT with Trace of Sand and Occasional Thin Silty Clay Seams.	LS-4	745.6	25.0	-	10-11-1
20.0'	LS-5	743.1	-	-	11-14-16
Compact Brown SANDY SILT. 22.5'	LS-6	740.6	21.5	-	15-18-24

ELEVATION - FEET: 760, 755, 750, 745, 740

NOTES:
1. Test boring drilled with 4 inch solid-stem augers to a depth of 3.5 feet, 3-1/2 inch diameter rotary wash below that depth.
2. No groundwater level information was obtained due to the use of drilling fluid.
3. Test boring fully grouted with non-shrinking cement grout.

TOTAL DEPTH: 22.5'
BORING STARTED: 2-26-85
BORING COMPLETED: 2-26-85
INSPECTOR: B.L. Forslund
DRILLER: W. Holloman
CONTRACTOR: Canonie Construction

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH 0 FEET OF CASING IN PLACE.

* PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 12 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS
LOG OF TEST BORING NUMBER 3

A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: BLF | DATE: 3-15-85
PROJECT NO. 84043 OW | FIGURE NO. 3

Figure 21

LOG OF SUBSURFACE PROFILE

CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION: 763.5

Depth (ft)	Description
1.0'	BROKEN LIMESTONE.
5.5	FILL: Loose to Medium Compact Brown SILTY SAND.
11.0'	FILL: Loose Brown GRAVELLY SAND with Little Wood.
13.0'	Medium Compact Brown SILTY FINE SAND.
19.5'	Very Stiff Gray SILTY CLAY with Little Sand, Trace of Gravel and Sand Lenses.
22.5'	Medium Compact Gray SILT with Trace of Sand.

ELEVATION – FEET: 760, 755, 750, 745, 740

SOIL SAMPLE DATA

SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION RESISTANCE * (0 10 20 30 40)
LS-1	761.0	-	-	5-5-6
LS-2	758.5	-	-	5-5-4
S-1	756.0	-	-	2-3-2
S-2	753.5	-	-	2-2-2
LS-3	751.0	20.4	-	7-14-14
LS-4	748.5	-	-	8-9-13
LS-5	746.0	20.4	-	3-4-8
LS-6	743.5	-	-	8-9-11
LS-7	741.0	23.0	-	12-13-7

NOTES:
1. Test boring drilled using wash and chop boring technique.
2. No groundwater level information was obtained due to the use of drilling fluid.
3. Test boring fully grouted with non-shrinking cement grout.

TOTAL DEPTH: 22.5'
BORING STARTED: 2-27-85
BORING COMPLETED: 2-27-85
INSPECTOR: B.L. Forslund
DRILLER: W. Holloman
CONTRACTOR: Canonie Construction

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH 0 FEET OF CASING IN PLACE.

* PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 12 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER 4

A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: BLF | DATE: 3-15-85
PROJECT NO. 84043 OW | FIGURE NO. 4

Figure 22

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION: 763.6

ELEVATION - FEET: 760, 755, 750, 745, 740

Depth	Description
0.0'–9.0'	FILL: Loose PEA GRAVEL.
9.0'–12.0'	FILL: Compact to Very Compact Brown SILTY FINE SAND.
12.0'–13.0'	Hard Gray SILTY CLAY with Some Sand and Trace of Gravel.
13.0'–20.0'	Medium Compact Gray SILT with Trace of Sand and Occasional Clay and Sand Seams.

SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION RESISTANCE * (0 10 20 30 40 50)
AS-1	761.6	-	-	
NO RECOVERY				2-1-1
LS-1	753.1	-	-	10-12-38
LS-2	751.1	16.3	-	16-20-27
LS-3	748.6	-	-	2-8-5
LS-4	746.1	22.7	-	3-4-3
LS-5	743.6	25.1	-	10-8-3

NOTES:
1. Test boring drilled using wash and chop boring technique.
2. No groundwater level information was obtained due to use of drilling fluid.
3. Test boring fully grouted with non-shrinking cement grout.

TOTAL DEPTH: 20.0'
BORING STARTED: 2-28-85
BORING COMPLETED: 2-28-85
INSPECTOR: B.L. Forslund
DRILLER: W. Holloman
CONTRACTOR: Canonie Construction

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH 0 FEET OF CASING IN PLACE.

* PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 12 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER 5

A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: BLF
DATE: 3-15-85
PROJECT NO. 84043 OW
FIGURE NO. 5

Figure 23

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION: 763.9

Depth (ft)	Description
	BROKEN LIMESTONE.
3.0'	Loose to Medium Compact Cobbly Brown SAND.
8.0'	Hard Mottled Brown and Gray SILTY CLAY with Trace of Sand and Gravel.
12.0'	Medium Compact Brown SAND AND SILT.
13.0'	Hard Gray CLAYEY SILT with Trace of Sand and Gravel.
17.5'	Medium Compact Gray SILT with Trace of Sand.

ELEVATION - FEET: 760, 755, 750, 745

SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION RESISTANCE * (0 10 20 30 40 5)
LS-1	760.9	-	-	4-5-9
LS-2	758.9	-	-	8-12-17
LS-3	756.4	-	-	7-13-20
LS-4	753.9	21.6	-	9-12-15
LS-5	751.4	-	-	8-17-25
LS-6	748.9	25.0	-	3-5-5
LS-7	746.4	25.4	-	7-8-11

NOTES:
1. Test boring drilled using wash and chop boring technique.
2. No groundwater level information was obtained due to the use of drilling fluid.
3. Test boring fully grouted with non-shrinking cement grout.

TOTAL DEPTH: 17.5'
BORING STARTED: 2-28-85
BORING COMPLETED: 3-01-85
INSPECTOR: B.L. Forslund
DRILLER: W. Holloman
CONTRACTOR: Canonie Construction

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH 0 FEET OF CASING IN PLACE.

* PENETRATION RESISTANCE:
NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 12 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER 6

A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: BLF
DATE: 3-15-85
PROJECT No. 84043 OW
FIGURE No. 6

Figure 24

CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD. GROUND SURFACE ELEVATION: 763.9	Depth	SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION RESISTANCE *
BROKEN LIMESTONE.	0.2'					
FILL: Mottled Brown to Dark Brown SAND.	2.0'	AS-1	762.9	-	-	
		AS-2	761.9	-	-	
Hard Brown SANDY CLAY with Some Silt and Trace of Gravel.	9.5'	LS-1	756.4	16.1	-	7-13-19
Very Compact Brown SILTY SAND with Trace of Gravel.	13.0'	LS-2	753.9	-	-	12-11-16
		LS-3	751.4	-	-	26-37-52
Hard Gray CLAYEY SILT with Trace of Sand.	15.5'	LS-4	748.9	-	-	11-12-11
Medium Compact Gray SILT with Trace of Sand.	17.5'	LS-5	746.4	-	-	7-8-9

ELEVATION - FEET: 760, 755, 750, 745

PENETRATION RESISTANCE scale: 0 10 20 30 40

NOTES:
1. Test boring drilled using wash and chop boring technique.
2. No groundwater level information was obtained due to the use of drilling fluid.
3. Test boring fully grouted with non-shrinking cement grout.

TOTAL DEPTH: 17.5'
BORING STARTED: 3-1-85
BORING COMPLETED: 3-1-85
INSPECTOR: B.L. Forslund
DRILLER: W. Holloman
CONTRACTOR: Canonie Construction

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH 0 FEET OF CASING IN PLACE.

* PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 12 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER 7

A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: BLF
DATE: 3-15-85
PROJECT No. 84043 OW
FIGURE No. 7

Figure 25

LOG OF SUBSURFACE PROFILE

CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION: 763.4

Description	Depth	Sample Number	Elev. (Feet)	Natural Moisture Content (Percent)	Dry Density (PCF)	Penetration* Resistance
Loose Gray GRAVEL.	0.7					
FILL: Loose Brown SILTY SAND and SILTY CLAY.	3.0					
Stiff Brown SILTY CLAY with Trace of Sand and Gravel.	6.0	S-1	758.4	-	-	2-5-8
Very Stiff Brown CLAYEY SILT with Some Fine Sand and Trace of Gravel	8.0	S-2	755.9	14.6	-	4-9-10
Loose Brown to Gray SILTY FINE SAND with Trace of Clay.	11.5	S-3	753.4	20.2	-	2-3-5
Medium Compact Gray SILTY SAND with Occasional Brown Silty Clay Seams.	13.0	S-4	750.9	-	-	9-16-12
Medium Compact Gray SILT with Trace of Fine Sand and Clay.	15.3	S-5	748.4	24.6	-	5-6-5

ELEVATION-FEET: 760, 755, 750, 745

ENC

NOTES:
1. Test boring was drilled using 8-inch diameter hollow stem auger.
2. Groundwater was encountered at a depth of 12.0 feet during drilling.
3. Monitor well P-14-U was installed in the test boring.

TOTAL DEPTH: 15.0'
BORING STARTED: 5/20/86
BORING COMPLETED: 5/20/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH ______ FEET OF CASING IN PLACE.

*PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 18 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER P-14-U

A.C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG
DATE: 8/01/86
PROJECT NO. 84043 OW
FIGURE NO. 26

LOG OF SUBSURFACE PROFILE

CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION: 763.5

Depth (ft)	Description
1.0	ASPHALT and CONCRETE.
2.0	FILL: Loose Brown SILTY SAND.
6.5	Stiff Brown SILTY CLAY with Trace of Sand and Gravel.
11.0	Loose Brown SILTY FINE SAND with Trace of Gravel and Clay.
12.4	Very Stiff Gray SILTY CLAY with Trace of Sand.
17.0	Stiff to Very Stiff Brown SILTY CLAY with Little Sand and Trace of Gravel, Occasional Silty Fine Sand Seams.
18.5	Stiff Gray CLAYEY SILT with Trace of Sand.
22.0	Medium Compact Gray FINE SANDY SILT with Trace of Clay.
33.0	Loose Gray SILTY FINE SAND.

ENC. (elevation ~751)

ELEVATION-FEET: 760, 755, 750, 745, 740, 735, 730

SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION* RESISTANCE
S-1	758.4	-	-	2-3-6
S-2	753.4	-	-	3-3-4
S-3	750.9	24.6	-	7-11-12
S-4	748.4	23.1	-	3-4-5
S-5	743.4	24.8	-	8-7-6
S-6	738.4	-	-	3-2-3
S-7	735.3	-	-	3-3-6
S-8	733.4	-	-	1-2-2
S-9	730.4			2-2-3

Penetration resistance scale: 0 10 20 30 40 50

NOTES:
1. Test boring was drilled using a 3 3/4-inch diameter solid stem auger to a depth of 12.5 feet. A 6-inch diameter casing was set to a depth of 14 feet and boring was completed using 5 3/4-inch diameter rotary wash.
2. Groundwater was encountered at a depth of 12.5 feet during drilling. No groundwater information was obtained upon completion of drilling due to use of drilling fluid.
3. Monitor well P-14-L was installed in test boring.

TOTAL DEPTH: 33.0'
BORING STARTED: 5/27/86
BORING COMPLETED: 5/27/86
INSPECTOR: J. Serwik
DRILLER: T. Blank
CONTRACTOR: American Drilling

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH ______ FEET OF CASING IN PLACE.

*PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 18 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER P-14-L

A. C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG | DATE: 9-1-86
PROJECT No. 84043 OW | FIGURE No. 27

LOG OF SUBSURFACE PROFILE		SOIL SAMPLE DATA				
CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD. GROUND SURFACE ELEVATION: 763.9	Depth	SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION* RESISTANCE 0 10 20 30 40 50
FILL: Dark Brown SILTY CLAY and SILTY SAND.	2.0					
Stiff Brown SILTY CLAY with Little Sand and Trace of Gravel.	7.7	S-1	758.9	21.6	-	3-5-6
Medium Compact Brown SILTY FINE SAND with Trace of Clay.	12.0	S-2	753.9	-	-	4-6-7
Hard SILTY CLAY with Trace of Sand and Gravel.	13.0	S-3	751.4	-	-	13-18-22
Stiff Gray SILTY CLAY with Little Sand and Trace of Gravel.	14.5	S-4	749.4	18.5	-	3-6-8

ELEVATION-FEET: 760, 755, 750, 745

NOTES:
1. Test boring was drilled using 5 3/4-inch diameter rotary wash.
2. No groundwater was encountered drilling.
3. Monitor well P-15-U was installed in test boring.

TOTAL DEPTH: 14.5'
BORING STARTED: 5/21/86
BORING COMPLETED: 5/21/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH ______ FEET OF CASING IN PLACE.

*PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 18 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER P-15-U

A.C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG
DATE: 8/01/86
PROJECT No. 84043 OW
FIGURE No. 28

LOG OF SUBSURFACE PROFILE

CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION: 764.0

ELEVATION-FEET	Description	Depth	SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION* RESISTANCE (0 10 20 30 40 50)
	FILL: Loose Gray GRAVEL.	1.0					
	FILL: Loose Dark Brown SILTY SAND with Trace of Clay.	2.5					
760	Stiff Mottled Brown and Gray SILTY CLAY with Trace of Sand and Gravel.	7.5	S-1	759.0	-	-	2-3-5
EN755	Medium Compact Brown SILTY FINE SAND.	9.5	S-2	754.0	-	-	2-6-8
	Stiff Brown SILTY CLAY with Trace of Gravel and Occasional Sand Seams.	11.0					
	Hard Gray SILTY CLAY with Trace of Sand and Gravel.	14.0	S-3	751.5	-	-	10-15-22
750	Soft to Medium Gray SILTY CLAY with Occasional Clayey Silt Seams.	15.0	S-4	749.0	33.8	-	2-3-3
	Loose Gray SILT with Occasional Seams of Silty Clay.	19.0	S-5	746.5	23.4	-	7-3-4
745	Loose Gray SILT with Trace of Clay.	22.5	S-6	744.0	21.0	-	6-4-4
740	Brown Medium to Coarse SAND with Trace of Silt, Clay and Gravel.	25.5	S-7	739.0	-	-	8-11-13
	Medium Compact to Compact Brown to Gray SILTY SAND with Trace of Gravel and Clay.	28.0	S-8	736.5	-	-	4-8-14
735	Compact Gray SILTY SAND with Trace of Gravel.	33.0	S-9	734.0	-	-	7-14-22
			S-10	731.0	-	-	8-14-20
730							

NOTES:
1. Test boring was drilled using 4-inch diameter rotary wash with a 6-inch diameter casing installed to a depth of 13.0 feet.
2. Groundwater was encountered at a depth of 9.5 feet during drilling. No groundwater information was obtained upon completion of drilling due to the use of drilling fluid.
3. Monitor well P-15-L was installed in the test boring.

TOTAL DEPTH: 33.0'
BORING STARTED: 5/22/86
BORING COMPLETED: 5/23/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH ______ FEET OF CASING IN PLACE.

*PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 18 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER P-15-L

A. C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG	DATE: 8/01/86
PROJECT NO. 84043 OW	FIGURE NO. 29

LOG OF SUBSURFACE PROFILE

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GROUND SURFACE ELEVATION:
763.75

Elevation (feet)	Description	Depth
	FILL: Loose SANDY GRAVEL.	0.6
	FILL: Loose Brown to Gray CLAYEY SAND.	1.5
ENC 760	FILL: Medium Mottled Brown and Gray SILTY CLAY with Trace of Sand, Gravel and Organic Material.	3.0
	Medium to Stiff Brown SILTY CLAY with Trace of Sand and Gravel.	7.7
755	Loose Brown SILTY FINE SAND with Trace of Clay.	10.5
	Medium Compact Brown SILTY FINE SAND with Trace of Clay.	13.7
750	Hard Gray SILTY CLAY with Trace of Sand and Gravel.	15.0
745		

ELEVATION-FEET

NOTES:
1. Test boring was drilled using an 8-inch diameter hollow stem auger.
2. Groundwater was encountered at a depth of 3.5 feet during drilling.
3. Monitor well P-16-U was installed in test boring upon completion of drilling.

SOIL SAMPLE DATA

SAMPLE NUMBER	ELEV. (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	PENETRATION* RESISTANCE (0 10 20 30 40 50)
S-1	758.8	-	-	1-2-3
S-2	753.8	-	-	2-2-3
S-3	751.3	22.5	-	5-11-7
S-4	748.8	-	-	7-12-19

TOTAL DEPTH: 15.0'
BORING STARTED: 5/19/86
BORING COMPLETED: 5/19/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH ______ FEET OF CASING IN PLACE.

*PENETRATION RESISTANCE:
NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 18 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER P-16-U

A. C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG	DATE: 8/01/86
PROJECT NO. 84043 OW	FIGURE NO. 30

LOG OF SUBSURFACE PROFILE		SOIL SAMPLE DATA				
Classifications By: NEYER, TISEO & HINDO, LTD. Ground Surface Elevation: 763.67	Depth	Sample Number	Elev. (Feet)	Natural Moisture Content (Percent)	Dry Density (PCF)	Penetration* Resistance (0 10 20 30 40 50)
FILL: Loose SANDY GRAVEL	2.7					
Stiff Brown SILTY CLAY with Trace of Sand and Gravel.	7.5	S-1	758.7	-	-	5-6-8
Loose to Medium Compact Brown SILTY FINE SAND with Trace of Gravel and Clay.	13.5	S-2	753.7	-	-	4-5-5
		S-3	751.2	-	-	5-12-16
Very Stiff Gray SILTY CLAY with Little Sand and Trace of Gravel.	16.5	S-4	748.7	22.0	-	7-8-11
Loose Gray CLAYEY SILT with Trace of Sand.	18.0	S-5	746.2	24.1	-	3-5-4
Loose Gray SILT with Trace of Clay.	21.0	S-6	743.7	24.6	-	3-4-3
Stiff Gray CLAYEY SILT with Trace of Sand and Clay.	23.5	S-7	741.2	25.0	-	6-6-5
Loose Gray FINE SANDY SILT with Trace of Clay.	26.0	S-8	738.7	19.5	-	3-2-2
Medium Compact Gray SILTY FINE SAND with Trace of Clay.	33.0	S-9	736.2	-	-	6-5-6
		S-10	733.7	-	-	7-9-13
		S-11	731.2	-	-	7-9-13

ELEVATION-FEET: 760, 755, 750, 745, 740, 735, 730

ENC

NOTES:
1. Test boring was drilled using a 3 3/4-inch diameter solid stem auger to a depth of 13.5 feet. Four inch diameter casing was set to a depth of 13.3 feet. The boring was completed using $5\frac{3}{4}$-inch diameter rotary wash.
2. Groundwater was encountered at a depth of 8.0 feet during drilling. No groundwater information obtained at completion of drilling due to use of drilling fluid.
3. Montior well P-16-L was installed in test boring upon completion of drilling.

TOTAL DEPTH: 33.0'
BORING STARTED: 5/15/86
BORING COMPLETED: 5/16/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling

WATER LEVEL IN HOLE AT INDICATED NUMBER OF HOURS AFTER COMPLETION OF BORING WITH ______ FEET OF CASING IN PLACE.

*PENETRATION RESISTANCE: NUMBER OF BLOWS REQUIRED TO DRIVE 2 INCH O.D. SOIL SAMPLER 18 INCHES, USING 140 POUND WEIGHT WITH 30 INCH FREE FALL.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

LOG OF TEST BORING NUMBER P-16-L

A.C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

Approved By: RFG	Date: 8/01/86
Project No. 84043 OW	Figure No. 31

PROJECT NO. 84043 OW

NEYER, TISEO & HINDO, LTD.

A.C. Spark Plug

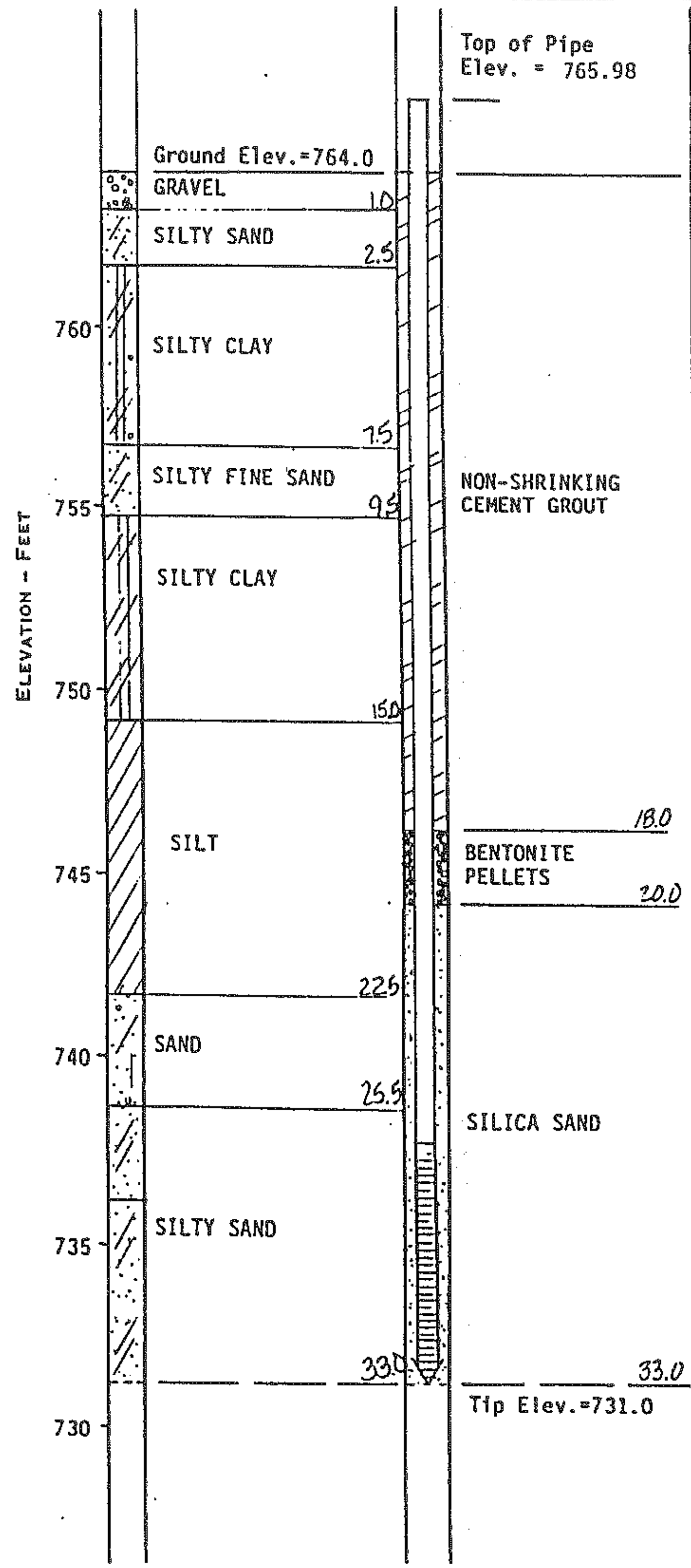
TABULATION OF TEST DATA

Test Boring or Test Pit Number	Sample Number	Depth of Sample Tip	Elevation of Sample Tip	Cohesion-One-Half of Unconfined Compressive Strength (PSF)	Unified Soil Classification	Natural Water Content (Percent of Dry Weight)	In-Place Dry Density (Pounds per Cubic Foot)	Permeability (Centimeters per Second)	Particle Size Distribution: Colloids (Percent)	Clay (Percent)	Silt (Percent)	Fine Sand (Percent)	Medium Sand (Percent)	Course Sand (Percent)	Gravel (Percent)	Atterberg Limits: Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)	Apparent Specific Gravity
P14L	S-3	12.5	752.1		CL	24.6			←	59	30	9	1	1	0	38	21	17	
	S-4	15.0	749.6		CL	23.1			←	54	28	13	4	1	0	31	17	14	
	S-5	20.0	744.6		ML	24.8			←	2	64	32	2	0	0	NON	PLASTIC		
P14U	S-2	7.5	755.9		CL-ML	14.6			←	29	36	29	4	2	0	22	15	7	
	S-3	10.0	753.4		SM	20.2			←	1	22	76	1	0	0	NON	PLASTIC		
	S-5	15.0	748.4		ML	24.6			←	12	87	1	0	0	0	24	22	2	
P15L	S-4	15.0	749.0		CL	33.8			←	64	35	1	0	0	0	39	20	19	
	S-5	17.5	746.5		ML	23.4			←	13	85	1	1	0	0	23	21	2	
	S-6	20.0	744.0		ML	21.0			←	4	92	3	1	0	0	NON	PLASTIC		
P15U	S-1	5.0	758.9		CL	21.6			←	47	34	17	2	0	0	37	20	17	
	S-4	14.5	749.4		CL	18.5			←	39	39	18	4	1	0	27	16	11	
P16L	S-4	15.0	748.7		CL	22.0			←	57	24	14	4	1	0	35	18	17	
	S-5	17.5	746.2		ML	24.1			←	14	82	3	1	0	0	24	21	3	
	S-6	20.0	743.7		ML	24.6			←	12	87	1	0	0	0	24	21	3	
	S-7	22.5	741.2		CL-ML	25.0			←	19	79	1	1	0	0	23	19	4	
	S-8	25.0	738.7		ML	19.5			←	3	51	46	0	0	0	NON	PLASTIC		
P16U	S-3	12.5	751.2		SM	22.5			←	1	22	76	1	0	0	NON	PLASTIC		

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
5/30/86	745.43	

CASING - DIAMETER: 2"
- LENGTH: 28.5'
- MATERIAL: Galvanized

SCREEN - DIAMETER: 2"
- LENGTH: 6.5'
- MESH: 7-slot
- MATERIAL: Stainless Steel

WELL STARTED: 5/23/86
WELL COMPLETED: 5/23/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling
EQUIPMENT: CME 75

NOTES:
1. Subsurface profile was taken from Log of Test Boring P-15-L
2. Top of casing elevation provided by S.S.O.E. surveyors.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

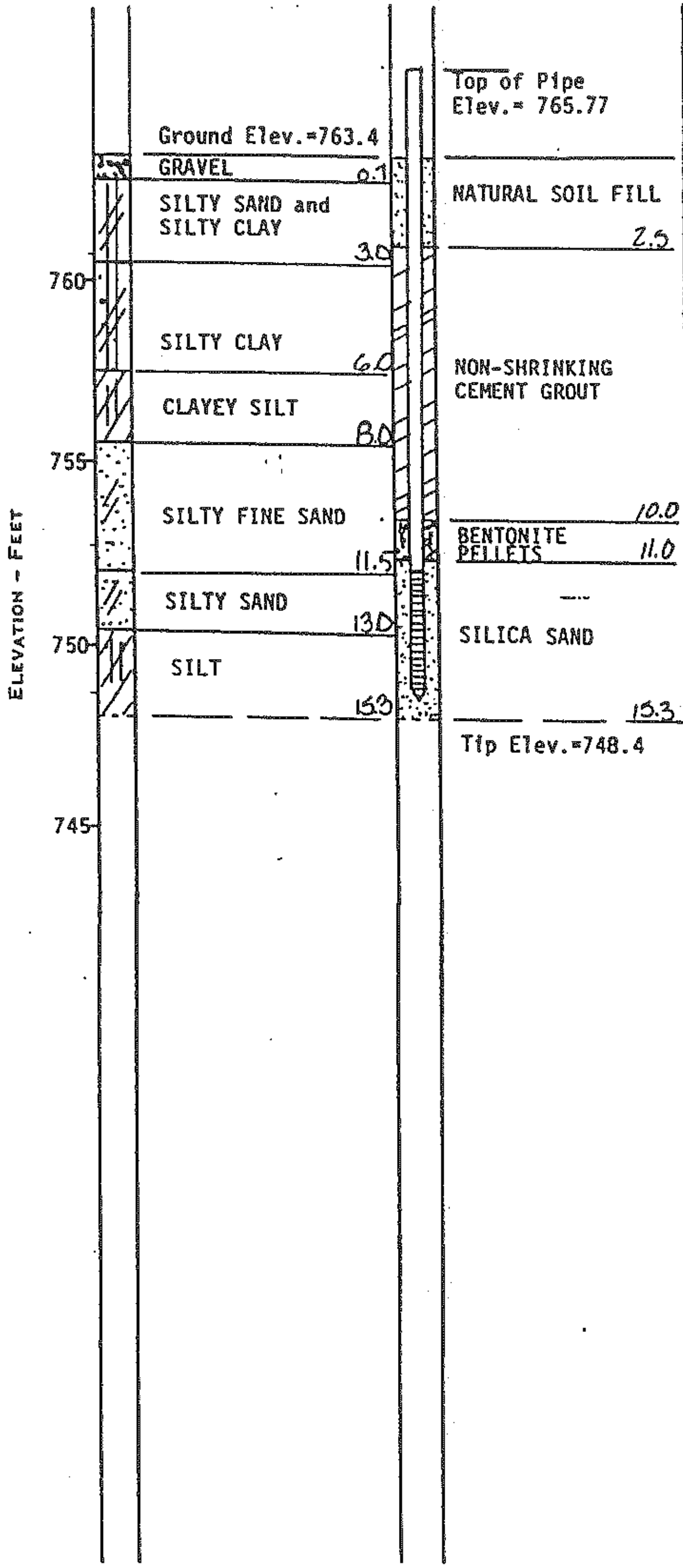
GROUNDWATER MONITORING WELL No. P-15-L

A.C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG	DATE: 8/01/86
PROJECT NO: 84043 OW	FIGURE NO: 33

LOG OF GROUNDWATER MONITORING WELL
CLASSIFICATIONS BY: NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
5/30/86	751.97	

CASING - DIAMETER: 2"
- LENGTH: 13.9'
- MATERIAL: Galvanized

SCREEN - DIAMETER: 2"
- LENGTH: 3.5'
- MESH: 7-slot
- MATERIAL: Stainless Steel

WELL STARTED: 5/20/86
WELL COMPLETED: 5/20/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling
EQUIPMENT: CME 75

NOTES:
1. Subsurface profile taken from Log of Test Boring P-14-U.
2. Top of casing elevation provided by S.S.O.E. surveyors.

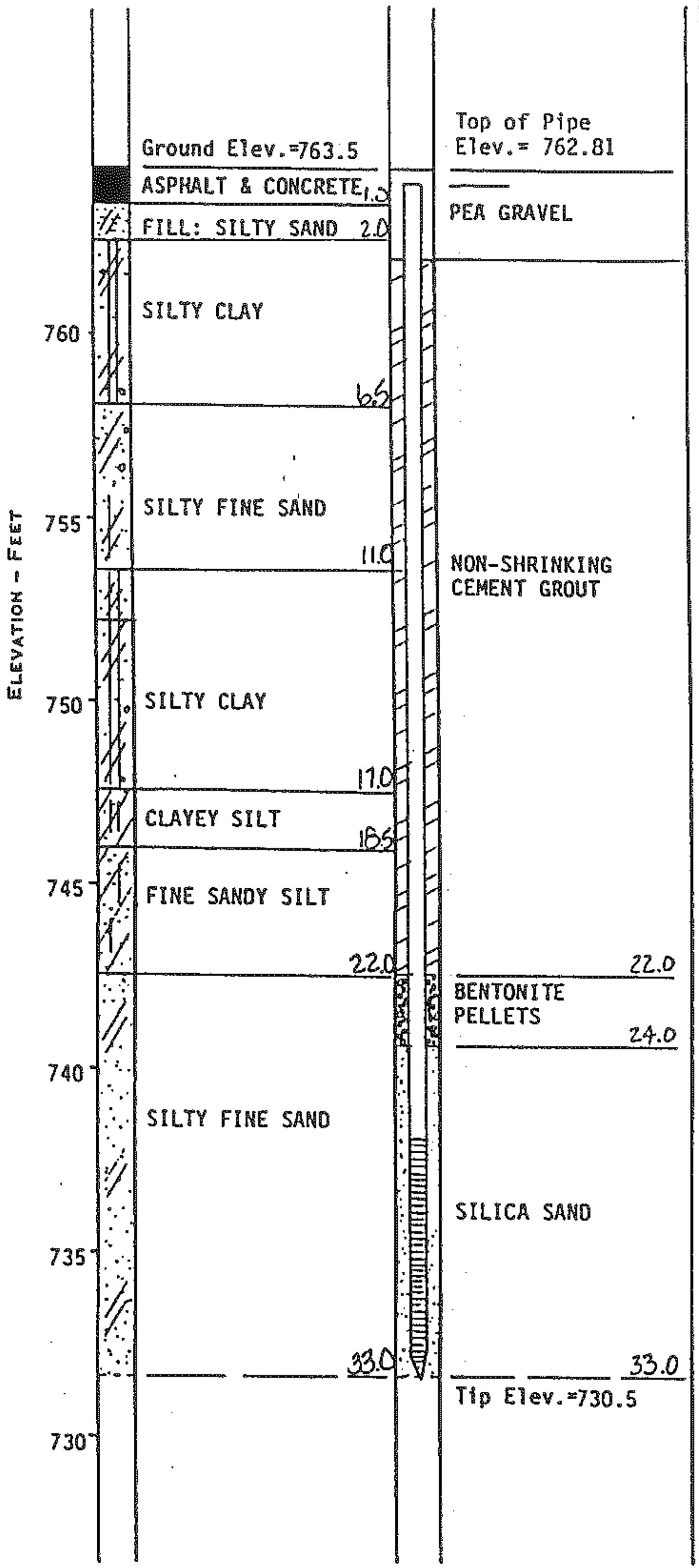
NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

GROUNDWATER MONITORING WELL No P-14-U

A.C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG	DATE: 9/1/86
PROJECT NO: 84043 OW	FIGURE NO: 34

Classifications By:
NEYER, TISEO & HINDO, LTD.



GROUNDWATER DATA

Date	Groundwater Elev. (Feet)	Comments
5/30/86	745.01	

CASING	– Diameter:	2"
	– Length:	26.2'
	– Material:	Galvanized
SCREEN	– Diameter:	2"
	– Length:	6.5'
	– Mesh:	7-slot
	– Material:	Stainless Steel
Well Started:		5/28/86
Well Completed:		5/28/86
Inspector:		J. Serwik
Driller:		B. Mills
Contractor:		American Drilling
Equipment:		CME 75

NOTES:
1. Subsurface profile taken from Log of Test Boring P-14-L.
2. Top of casing elevation provided by S.S.O.E. surveyors.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

Groundwater Monitoring Well No. P-14-L

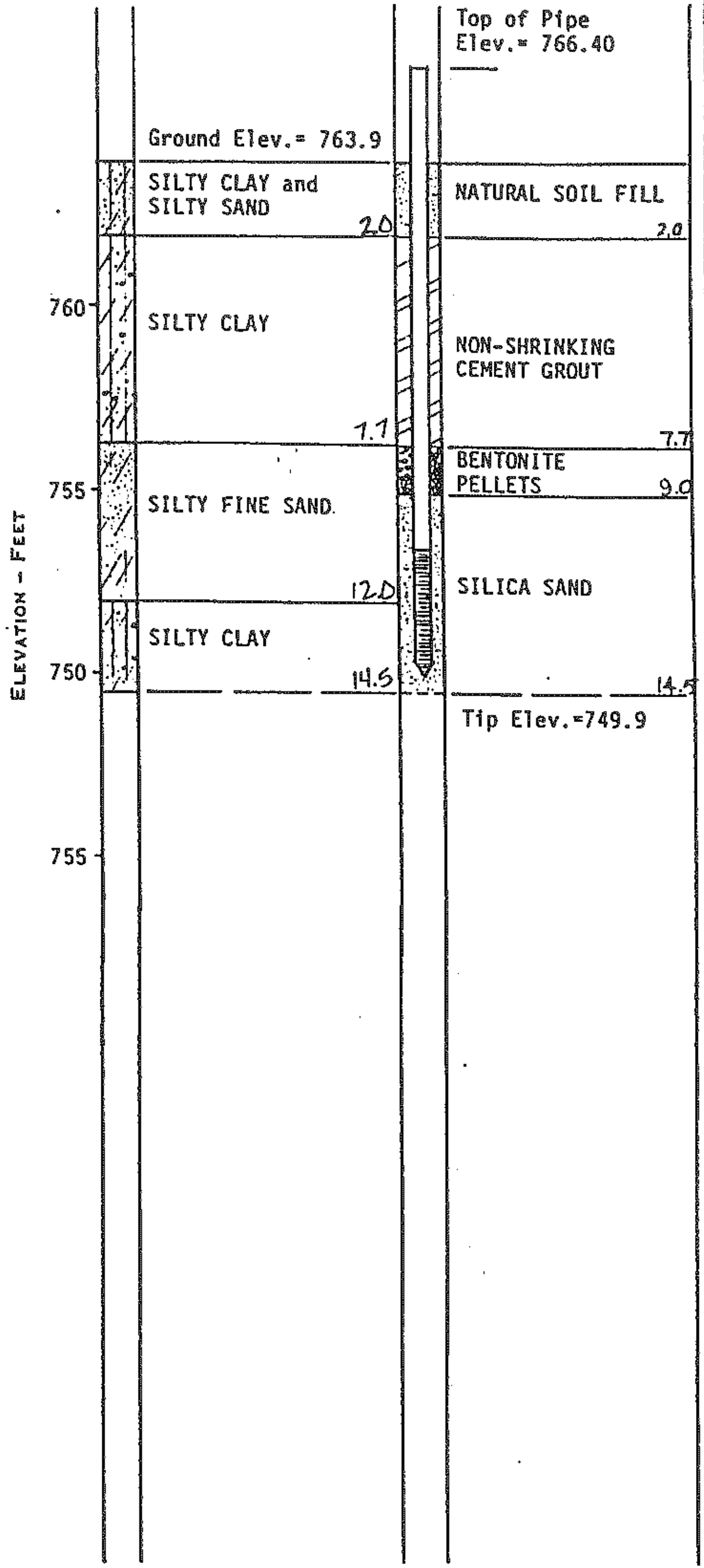
A. C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

Approved by: RFG	Date: 8/01/86
Project No: 84043 OW	Figure No: 35

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE | WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
5/30/86	754.15	

CASING - DIAMETER: 2"
- LENGTH: 13.0'
- MATERIAL: Galvanized

SCREEN - DIAMETER: 2"
- LENGTH: 3.5'
- MESH: 10-slot
- MATERIAL: Stainless Steel

WELL STARTED: 5/21/86
WELL COMPLETED: 5/22/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling
EQUIPMENT: CME 75

NOTES:
1. Subsurface profile taken from Log of Test Boring P-15-U
2. Top of casing elevation provided by S.S.O.E. surveyors.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

GROUNDWATER MONITORING WELL No. P-15-U

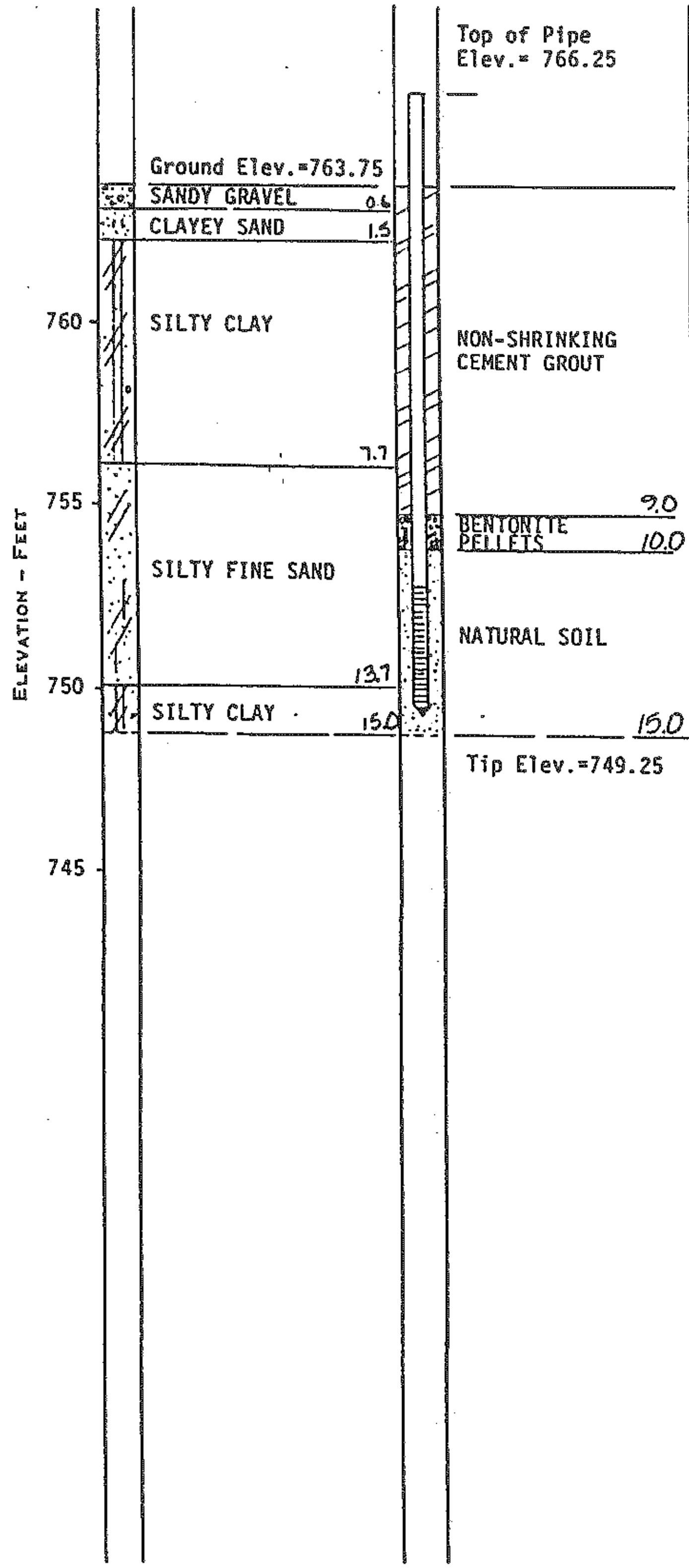
A. C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG	DATE: 8/01/86
PROJECT NO: 84043 OW	FIGURE NO: 36

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE	WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
5/30/86	754.30	

CASING	– DIAMETER:	2"
	– LENGTH:	13.5'
	– MATERIAL:	Galvanized
SCREEN	– DIAMETER:	2"
	– LENGTH:	3.5'
	– MESH:	7-slot
	– MATERIAL:	Stainless Steel
WELL STARTED:		5/19/86
WELL COMPLETED:		5/20/86
INSPECTOR:		J. Serwik
DRILLER:		B. Mills
CONTRACTOR:		American Drilling
EQUIPMENT:		CME 75

NOTES:
1. Subsurface profile taken from Log of Test Boring P-16-U
2. Top of casing elevation provided by S.S.O.E. surveyors.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

GROUNDWATER MONITORING WELL No. P-16-U

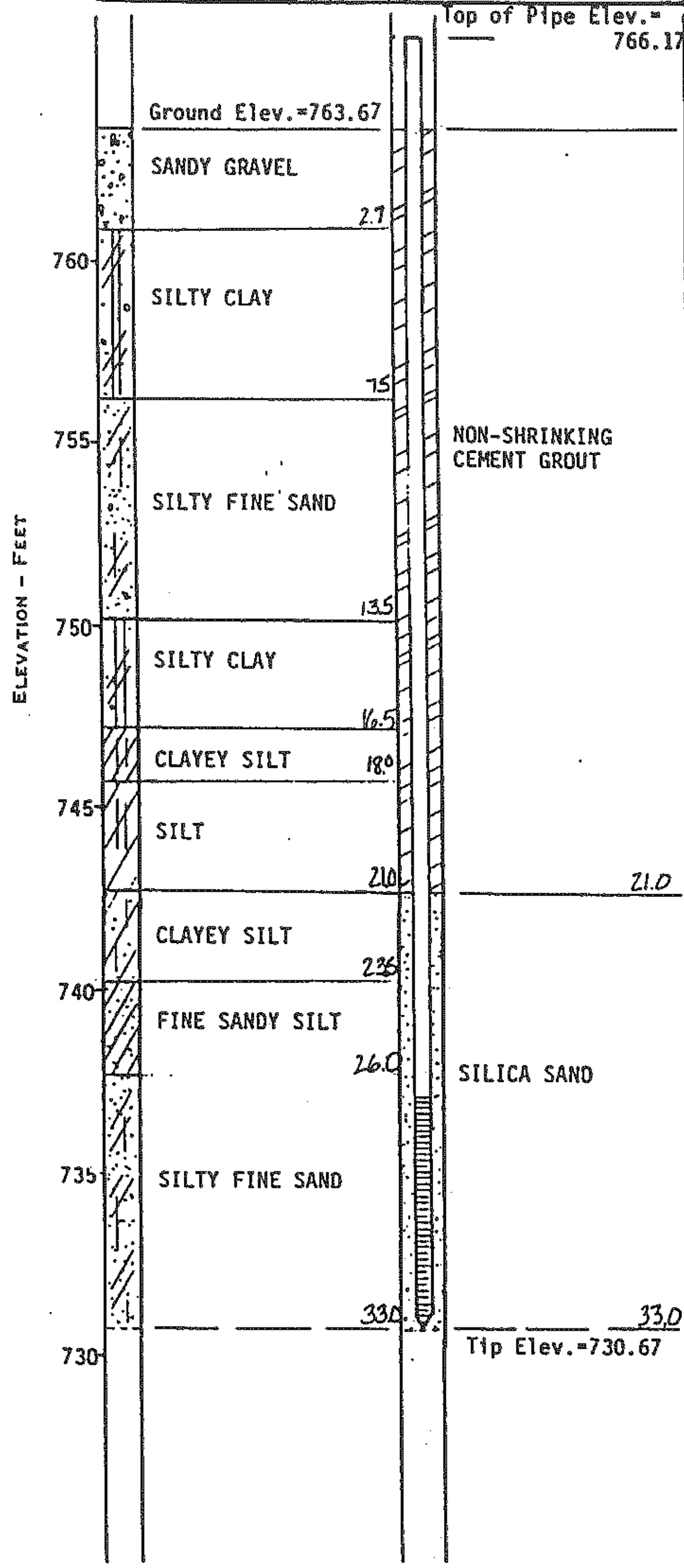
A. C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG	DATE: 8/01/86
PROJECT NO: 34043 OW	FIGURE NO: 37

LOG OF GROUNDWATER MONITORING WELL

CLASSIFICATIONS BY:
NEYER, TISEO & HINDO, LTD.

GENERALIZED SUBSURFACE PROFILE | WELL SCHEMATIC



GROUNDWATER DATA

DATE	GROUND-WATER ELEV. (FEET)	COMMENTS
5/30/86	745.37	

CASING - DIAMETER: 2"
- LENGTH: 29'
- MATERIAL: Galvanized

SCREEN - DIAMETER: 2"
- LENGTH: 6.5'
- MESH: 7-slot
- MATERIAL: Stainless Steel

WELL STARTED: 5/16/86
WELL COMPLETED: 5/16/86
INSPECTOR: J. Serwik
DRILLER: B. Mills
CONTRACTOR: American Drilling
EQUIPMENT: CME 75

NOTES:
1. Subsurface profile taken from Log of Test Boring P-16-L
2. Top of casing elevation provided by S.S.O.E. surveyors.

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS

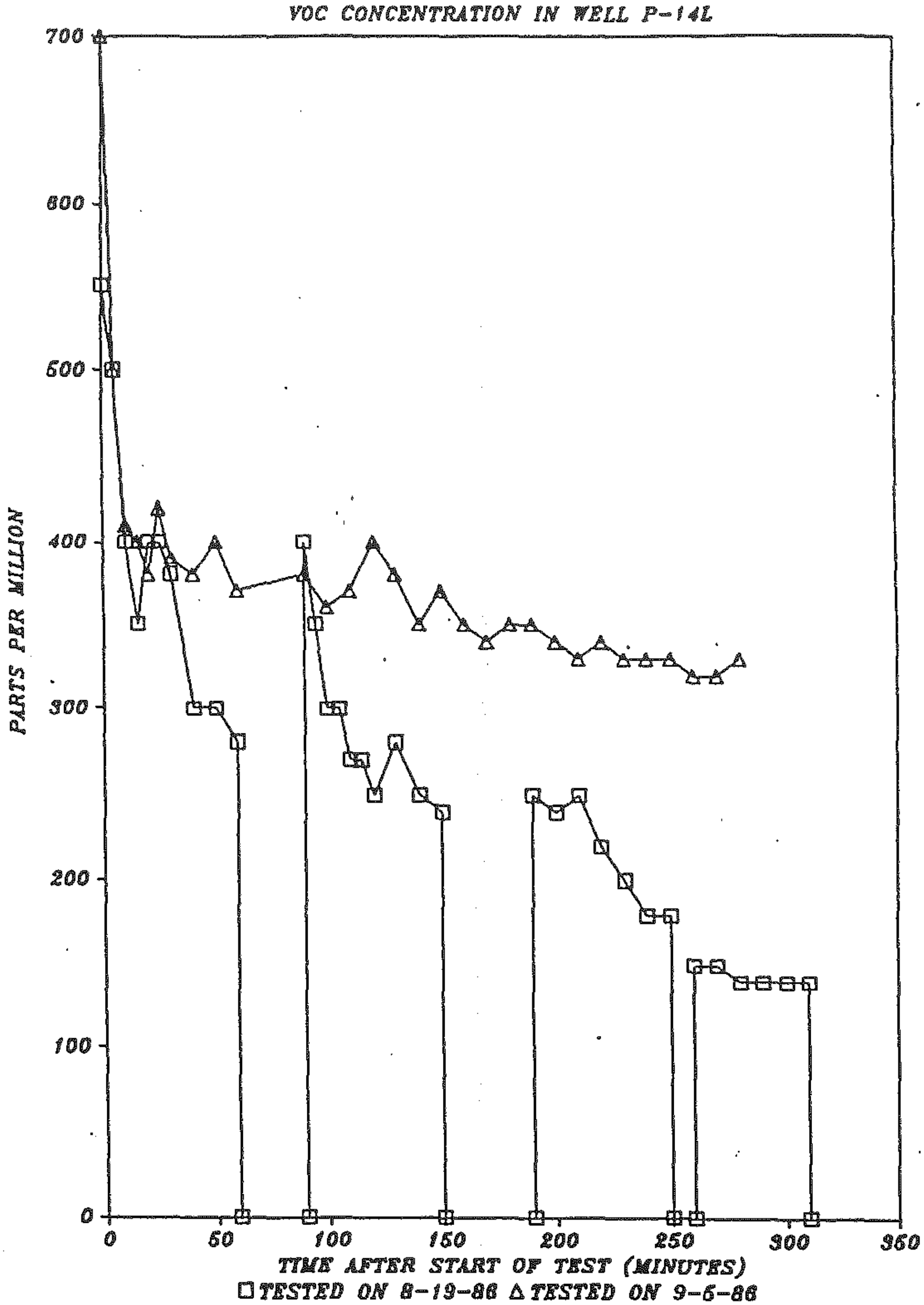
GROUNDWATER MONITORING WELL No. P-16-L

A.C. SPARK PLUG
MANUFACTURING FACILITY
FLINT, MICHIGAN

APPROVED BY: RFG	DATE: 8/01/86
PROJECT NO: 84043 OW	FIGURE NO: 38

APPENDIX B: Diagrams, Tables and Plates

LIST OF PLATES



NOTES:

VOC- VOLATILE ORGANIC COMPOUNDS
AS MEASURED WITH HNU METER
AT WELL DISCHARGE

WATER QUALITY PUMPING TEST RESULTS- WELL P-14L

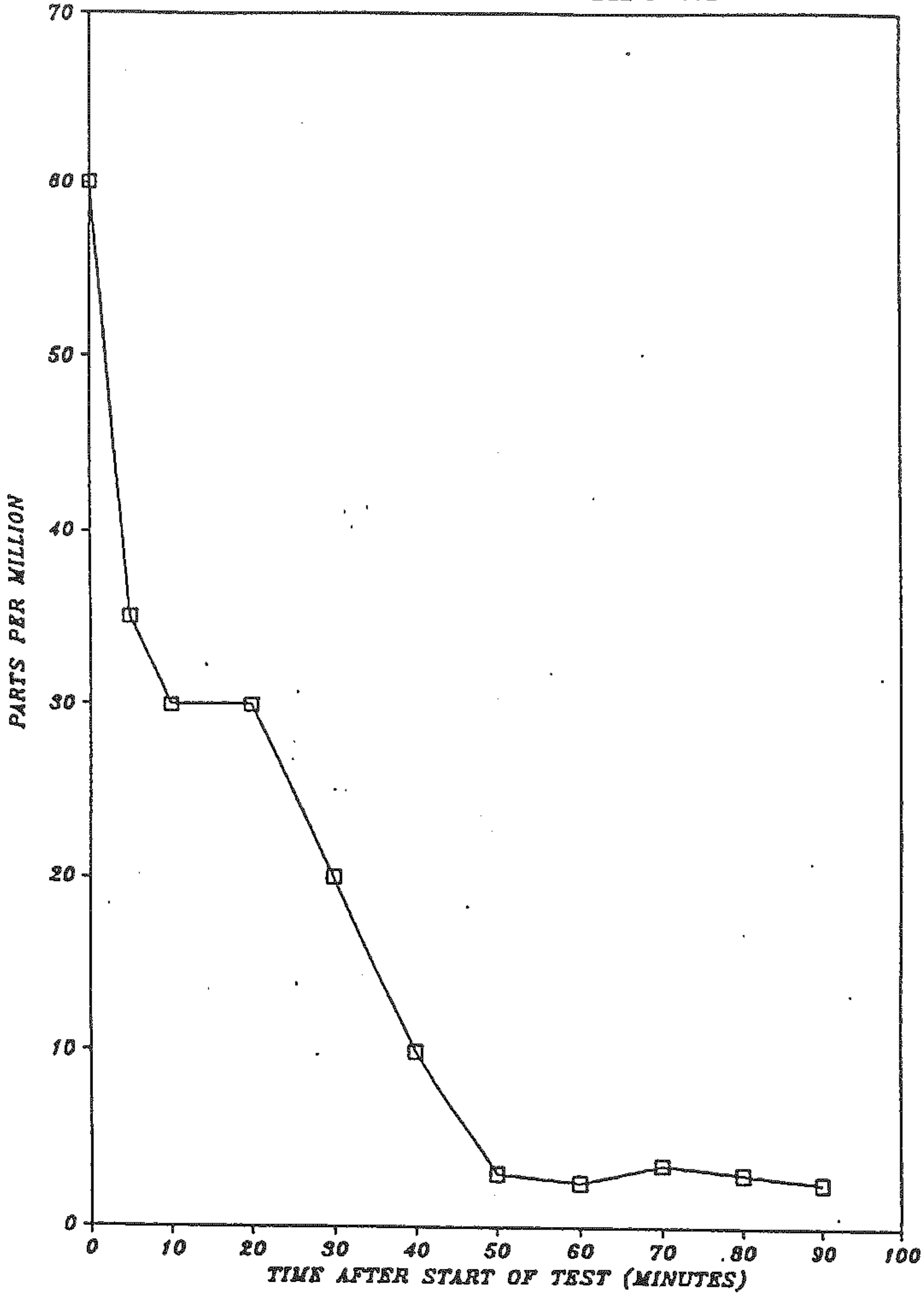
REMEDIAL ACTION PLAN- PUMPING OPTION
BENZENE- GASOLINE CONTAMINATION
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS AND GEOLOGISTS
38865 HILLS TECH DRIVE • FARMINGTON HILLS, MI 48018

PROJECT NO. 84043	DRAWN BY: GK	DATE: 6-5-87
SCALE: AS SHOWN	CHECKED BY:	SHEET 1 OF 1

FIGURE 1

VOC CONCENTRATION IN WELL P-16L



NOTES:

VOC- VOLATILE ORGANIC COMPOUNDS
AS MEASURED WITH HNU METER
AT WELL DISCHARGE

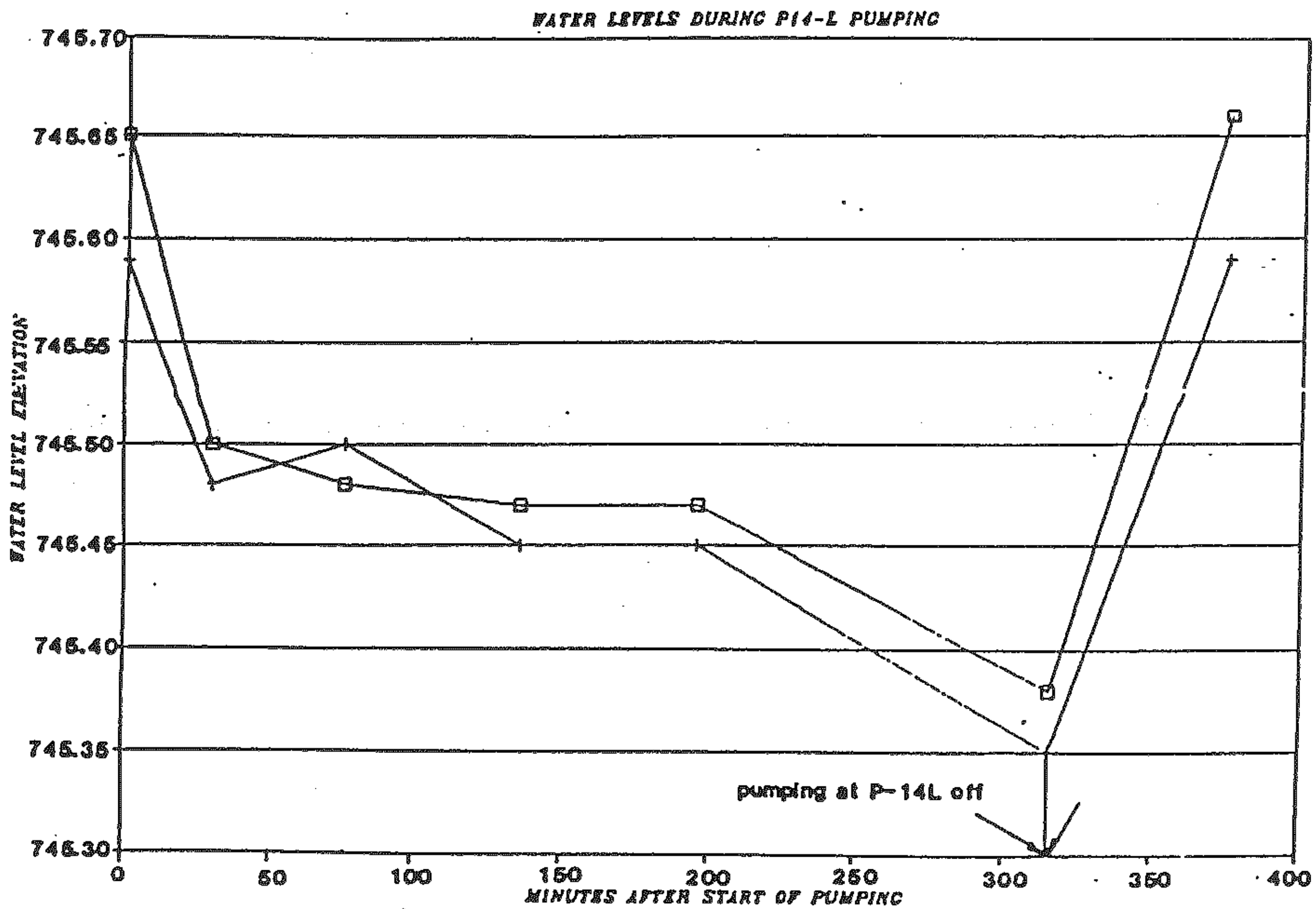
WATER QUALITY PUMPING TEST RESULTS- WELL P-16L

REMEDIAL ACTION PLAN- PUMPING OPTION
BENZENE- GASOLINE CONTAMINATION
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS AND GEOLOGISTS
[illegible] HILLS TECH DRIVE • FARMINGTON HILLS, MI [illegible]

PROJECT NO.:84043	DRAWN BY: OK	DATE: 6-5-87
SCALE: AS SHOWN	CHECKED BY:	SHEET 1 OF 1

FIGURE 2



NOTES:

☐ WATER LEVEL ELEVATIONS OBSERVED IN WELL NO. P-15L

+ WATER LEVEL ELEVATIONS OBSERVED IN WELL NO. P-16L

WELL P-14L PUMPED AT APPROX. 15 GPM

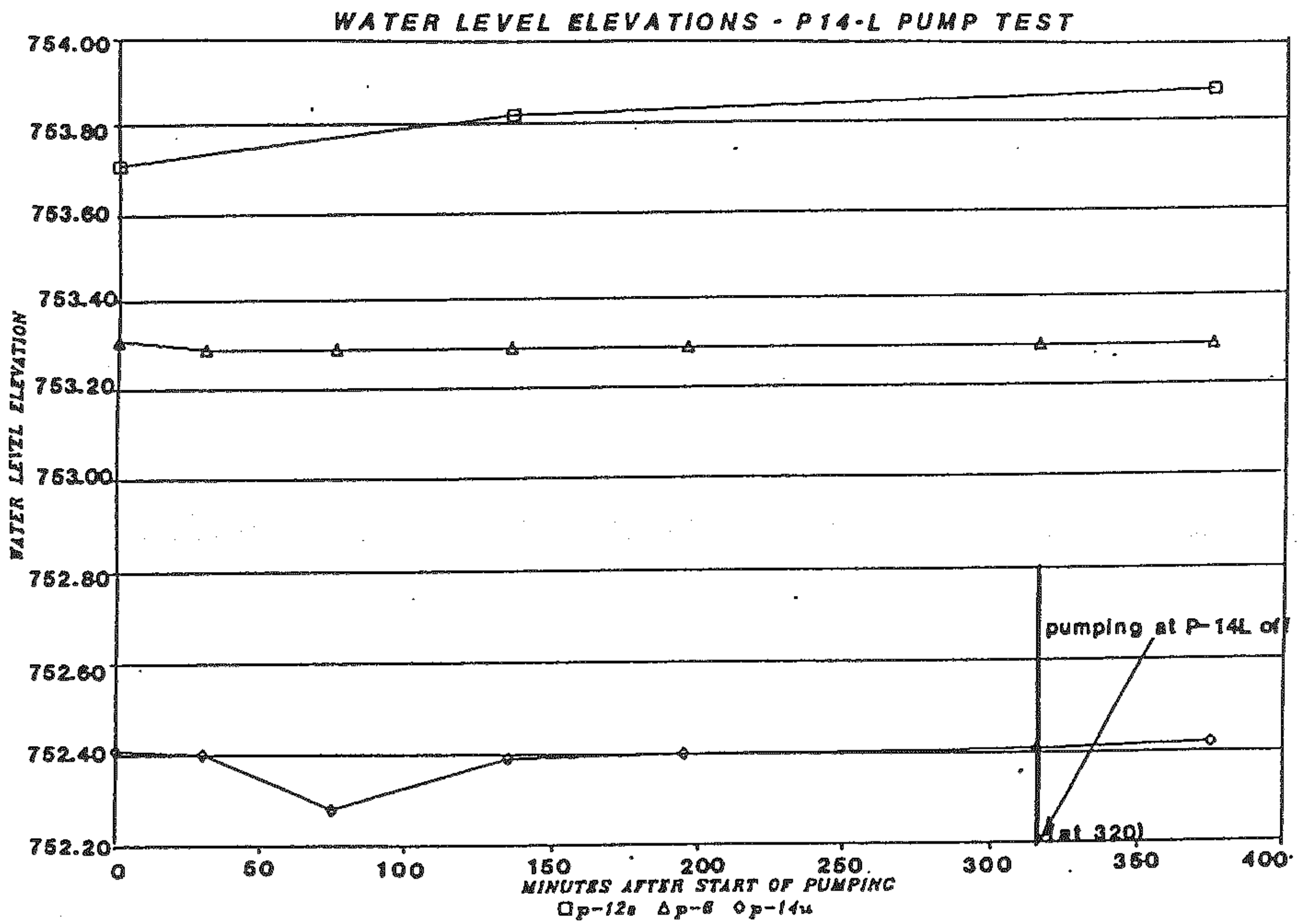
AQUIFER INTERCONNECTION TEST

REMEDIAL ACTION PLAN- PUMPING OPTION
BENZENE- GASOLINE CONTAMINATION
A.C. SPARK PLUG MANUFACTURING FACILITY
FLINT, MICHIGAN

NEYER, TISEO & HINDO, LTD.
CONSULTING ENGINEERS AND GEOLOGISTS
38955 HILLS TECH DRIVE • FARMINGTON HILLS, MI 48018

PROJECT NO.: 84043	DRAWN BY: OK	DATE: 6-5-87
SCALE: AS SHOWN	CHECKED BY:	SHEET 1 OF 1

FIGURE 3



NOTES:

□ WATER LEVEL ELEVATIONS OBSERVED IN WELL NO. 12S

△ WATER LEVEL ELEVATIONS OBSERVED IN WELL NO. P-6

◇ WATER LEVEL ELEVATIONS OBSERVED IN WELL NO. 14U

AQUIFER INTERCONNECTION TEST		
REMEDIAL ACTION PLAN- PUMPING OPTION BENZENE- GASOLINE CONTAMINATION A.C. SPARK PLUG MANUFACTURING FACILITY FLINT, MICHIGAN		
NEYER, TISEO & HINDO, LTD. CONSULTING ENGINEERS AND GEOLOGISTS 38955 HILLS TECH DRIVE • FARMINGTON HILLS, MI 48018		
PROJECT NO. 84043	DRAWN BY: GK	DATE: 6-5-87
SCALE: AS SHOWN	CHECKED BY:	SHEET 1 OF 1

FIGURE 4

Project No. 84043 OW

Table 2
Compilation of Groundwater Level Elevations
Engineering Building Tank Farm
AC Spark Plug Division - Manufacturing Facility
Flint, Michigan

Well No.	Top of Casing Elevation	3/7/84	3/19/84	3/31/84	4/10/84	4/23/84	5/7/84	9/25/84	1/7/85	3/6/85
P-1	763.28	Dry	747.49	-	-	747.79	747.79	747.68	747.7	751.8
P-1A	763.32	744.52	744.92	-	-	745.37	745.41	744.77	*747.8	745.2
P-2	764.12	745.52	745.61	-	-	745.37	747.45	744.67	-	748.7
P-3	762.06	Dry	744.37	-	-	744.44	744.40	Dry	Dry	744.4
P-4	762.83	749.60	748.58	-	-	751.43	751.43	-	749.5	755.4
P-5	765.42	747.00	747.36	-	-	749.01	749.01	747.32	-	751.8
P-6	765.61	750.26	750.54	-	-	751.66	751.66	748.77	-	754.5
P-7	762.94	752.13	750.40	-	-	753.25	753.19	751.94	752.5	753.8
P-7A	763.31	744.77	744.95	-	-	745.12	745.43	744.73	744.9	745.3
P-8	763.06	744.46	744.72	744.87	745.02	745.42	-	744.48	-	-
P-9	760.91	743.96	744.36	744.27	744.42	744.52	744.52	744.01	-	-
P-10	763.50	744.42	744.50	744.55	744.68	744.92	-	744.25	-	-
P-11S	764.07	-	-	*748.37	744.95	745.21	-	744.67	-	-
P-11D	763.96	-	-	744.86	744.84	745.08	-	744.48	-	-
P-12S	762.05	-	-	-	752.22	752.84	-	750.85	-	-
P-12D	761.51	-	-	-	744.83	744.86	-	744.80	-	-
P-13S	763.22	-	-	744.68	744.80	745.03	-	744.33	-	-
P-13D	763.47	-	-	744.78	744.85	745.04	-	744.36	-	-
P-14U	765.77	-	-	-	-	-	-	-	-	-
P-14L	762.81	-	-	-	-	-	-	-	-	-
P-15U	766.40	-	-	-	-	-	-	-	-	-
P-15L	765.98	-	-	-	-	-	-	-	-	-
P-16U	766.25	-	-	-	-	-	-	-	-	-
P-16L	766.17	-	-	-	-	-	-	-	-	-

* Water level may be inaccurate.

FIGURE 5

Table 2 (cont.)
Compilation of Groundwater Levels
Engineering Building Tank Farm
AC Spark Plug Division - Manufacturing Facility
Flint, Michigan

Well No.	Casing Elevation	4/8/86	4/11/86	5/30/86	6/12/86	7/8/86	8/13/86	Corrected For Floating Hydrocarbons 8/13/86	8/19/86	9/4/86
P-1	763.28	752.83	752.86	-	-	-	-	-	-	-
P-1A	763.32	*743.17	746.07	-	-	-	-	-	-	-
P-2	764.12	751.12	751.68	-	750.12	-	745.42	744.12	745.20	745.42
P-3	762.06	*747.61	745.15	-	-	-	-	-	-	-
P-4	762.83	*754.58	753.93	-	-	-	-	-	-	-
P-5	765.42	*752.57	750.81	-	752.86	-	752.16	751.96	751.84	750.69
P-6	765.61	*752.96	753.7	-	752.61	-	750.51	750.26	750.40	750.49
P-7	762.94	753.84	754.12	-	752.94	-	752.24	751.74	751.82	752.02
P-7A	763.31	*746.76	745.66	-	-	-	-	-	-	-
P-8	763.06	745.26	-	-	-	745.21	744.62	744.62	744.55	744.91
P-9	760.91	744.01	-	-	-	744.86	744.56	744.56	744.52	744.49
P-10	763.50	-	-	-	-	745.21	744.62	744.62	744.55	744.73
P-11S	764.07	745.62	-	-	-	745.22	744.87	744.87	744.77	745.02
P-11D	763.96	745.40	-	-	-	745.15	745.26	745.26	745.23	744.90
P-12S	762.05	*752.25	-	-	-	751.95	751.56	751.56	751.60	751.63
P-12D	761.51	743.91	-	-	-	744.76	745.35	745.35	745.25	744.70
P-13S	763.22	745.22	-	-	-	-	744.92	744.92	-	-
P-13D	763.47	745.07	-	-	-	745.37	744.97	744.97	744.93	744.94
P-14U	765.77	-	-	751.97	749.37	752.02	748.40	748.40	Dry	Dry
P-14L	762.81	-	-	745.01	744.72	744.96	744.91	744.41	744.64	744.91
P-15U	766.40	-	-	754.15	755.60	754.05	753.90	753.90	753.75	754.53
P-15L	765.98	-	-	745.43	745.38	745.63	745.23	745.23	745.23	745.7
P-16U	766.25	-	-	754.30	755.15	754.20	753.65	753.65	753.55	753.88
P-16L	766.17	-	-	745.37	745.37	745.32	745.27	745.27	745.17	745.17

* Water level may be inaccurate.

FIGURE 5

Table 2 (cont.)
Compilation of Groundwater Levels
Engineering Building Tank Farm
AC Spark Plug Division - Manufacturing Facility
Flint, Michigan

Well No.	Top of Casing Elevation	Corrected For Floating Hydrocarbons 9/4/86	9/17/86	Corrected For Floating Hydrocarbons 9/17/86	10/1/86	10/8/86	1/7/87	Corrected For Floating Hydrocarbons 1/7/87	1/30/87	6/1/87
P-1	763.28	-	-	-	-	-	-	-	-	-
P-1A	763.32	-	-	-	-	-	-	-	-	-
P-2	764.12	744.92	746.23	745.33	748.28	747.56	Dry	Dry	Dry	745.62
P-3	762.06	-	-	-	-	-	-	-	-	-
P-4	762.83	-	-	-	-	-	-	-	-	-
P-5	765.42	750.19	751.77	751.77	753.62	753.33	751.62	751.62	748.01	748.53
P-6	765.61	749.79	-	-	753.31	752.87	749.51	749.41	749.56	749.17
P-7	762.94	751.62	753.16	753.16	754.29	753.99	-	-	751.19	-
P-7A	763.31	-	-	-	-	-	-	-	-	-
P-8	763.06	744.91	-	-	745.75	-	743.16	743.16	-	744.13
P-9	760.91	744.49	-	-	745.05	745.15	744.00	744.00	-	743.85
P-10	763.50	744.73	744.88	744.88	745.57	-	744.25	744.25	-	744.06
P-11S	764.07	745.02	745.05	745.05	745.47	745.74	744.47	744.47	-	744.61
P-11D	763.96	744.90	745.10	745.10	745.45	745.6	744.25	744.25	743.75	744.23
P-12S	762.05	751.63	752.43	752.43	753.71	753.35	751.85	751.85	751.25	751.66
P-12D	761.51	744.70	744.66	744.66	745.11	745.95	744.26	744.26	743.75	744.06
P-13S	763.22	-		-	-	-	-	-	-	744.20
P-13D	763.47	744.94	745.11	745.11	745.29	-	744.37	744.37	743.87	744.19
P-14U	765.77	Dry	751.09	751.09	752.41	752.42	Dry	Dry	-	748.91
P-14L	762.81	744.81	745.04	745.04	745.34	-	743.34	743.34	744.39	744.02
P-15U	766.40	754.53	755.78	755.78	753.05	754.87	-	-	752.95	753.79
P-15L	765.98	745.17	745.33	745.33	745.65	745.78	744.65	744.65	744.53	744.23
P-16U	766.25	753.88	754.54	754.54	755.32	755.08	753.80	753.80	753.80	753.93
P-16L	766.17	745.17	745.36	745.36	745.59	745.89	744.62	744.62	744.62	744.33

FIGURE 5

Project No. 84043 AW

TABLE 3 - COMPILATION OF GROUNDWATER ANALYSIS

ENGINEERING BUILDING TANK FARM
AC SPARK PLUG DIVISION - MANUFACTURING FACILITY
FLINT, MICHIGAN

CONCENTRATION OF BENZENE IN PPB

	DATE										
WELL	11-03-83	11-17-83	03-12-84	04-24-84	10-02-84	09-26-85	11-01-85	04-08-86	06-12-86	08-18-86	01-29-87
P-1	390,000	350,000	dry	-	-	-	185,000	165,000	(1)	(1)	(1)
P-1A	130,000	87,000	140,000	-	262,000	-	560,000	250,000	(1)	(1)	(1)
P-2	10%	48,000	(4)	-	≤10%	-	7-8%	1%	18,200 (2)	29.5%	dry
P-3	340	2,000	dry	-	-	-	-	2,000	(1)	(1)	(1)
P-4	59	440	3,900	-	<3	-	-	12,000	(1)	(1)	(1)
P-5	38	3,000	1	-	18,500	-	13,000	20,000	14,150	11,300	6,700
P-6	<1	7,000	14	-	<1	-	1,200	2,000	220	200	<1
P-7	250,000	520,000	(4)	-	-	-	11,200	1,000	310	3	360
P-7A	520	3	26,000	-	21,000	-	<1	820	-	-	-
P-8			1	<1	<1	<1	-	<1	-	-	-
P-9			2	<1	<1	<1	-	<1	-	-	-
P-10			1	11	<1	1	-	-	-	-	-
P-11S				<1	-	<1	-	<1	-	-	-
P-11D				<1	<1	<1	-	<1	-	<1	<1
P-12S				<1	<1	<1	-	<1	-	<1	<1
P-12D				<1	<1	<1	-	<1	-	<1	<1
P-13S				<1	<1	<1	-	<1	-	-	-
P-13D				<1	4	<1	-	<1	-	2	<1
P-14U								(3)	389,000	dry	dry
P-14L								(3)	10,300	21,000	4,900
P-15U								(3)	1,400	4,000	<1
P-15L								(3)	20	20	7
P-16U								(3)	<1	2	<1
P-16L								(3)	140	6	2

(1) Well plugged and abandoned May, 1986
(2) Average of duplicate samples
(3) Well installed May, 1986
(4) VOA analysis indicated aliphatic and aromatic hydrocarbons (see Table 4)

FIGURE 6

Project No. 84043 AW

TABLE 4 - COMPILATION OF GROUNDWATER ANALYSIS

ENGINEERING BUILDING TANK FARM
AC SPARK PLUG DIVISION - MANUFACTURING FACILITY
FLINT, MICHIGAN

CONCENTRATION OF GASOLINE IN PPB (except as noted)

DATE

WELL	11-03-83	11-17-83	03-12-84	04-24-84	10-02-84	09-26-85	11-01-85	04-08-86	06-12-86	08-18-86	01-29-87
P-1	100,000	29,000	dry	–	–	–	180,000	2,000,000	(1)	(1)	(1)
P-1A	32,000	12,000	6,400	–	66,000	–	2,625,000	480,000	(1)	(1)	(1)
P-2	35,000 mg/kg	33,000	>70% (3)	–	80-90%	–	90-93%	88%	273,900 (2)	90%	dry
P-3	2,700	8,000	dry	–	dry	–	dry	137,000	(1)	(1)	(1)
P-4	1,300	330	2,500	–	<30	–	–	370,000	(1)	(1)	(1)
P-5	290	14,000	38	–	22,000	–	22,800	440,000	59,800	46,000	27,400
P-6	<5	6,000	46	–	<15	–	8,000	170,000	4,170	960	<50
P-7	89,000	11,500	>70% (3)	–	–	–	400,000	145,000	43,050	200	12,500
P-7A	<25	10	44	–	1,200	–	<50	3,000	(1)	(1)	(1)
P-8			14	<10	<15	<10	–	<100	–	–	–
P-9			24	<10	<15	<10	–	<100	–	–	–
P-10			10	<10	<15	<10	–	–	–	–	–
P-11S				<10	–	<10	–	<100	–	–	–
P-11D				<10	<15	<10	–	<100	–	<50	<50
P-12S				<10	<15	<10	–	<100	–	<50	<50
P-12D				<10	<15	<10	–	<100	–	<50	<50
P-13S				<10	<15	<10	–	<100	–	–	–
P-13D				<10	<15	<10	–	<100	–	<50	<50
P-14U								(4)	618,700	dry	dry
P-14L								(4)	163,200	229,600	81,000
P-15U								(4)	9,150	11,300	<50
P-15L								(4)	<50	<50	<50
P-16U								(4)	<50	<50	<50
P-16L								(4)	<50 ?	<50	<50

(1) Well plugged and abandoned May, 1986
(2) Average of duplicate samples
(3) VOA analysis indicated aliphatic and aromatic hydrocarbons
(4) Wells installed May, 1986

FIGURE 7

Project No. 84043 AW
ENGINEERING BUILDING TANK FARM
AC SPARK PLUG DIVISION - MANUFACTURING FACILITY
FLINT, MICHIGAN

TABLE 5

THICKNESS OF FLOATING HYDROCARBONS
IN ON-SITE MONITORING WELLS
(thickness in feet)

Well Number	8/13/86	9/4/86	9/17/86	1/7/87	6/1/87
P-2	1.3	0.5	0.90	Dry	>0.2
P-5	0.2	0.5	<0.01	<0.01	<0.01
P-6	0.25	0.7	<0.01	0.1	<0.01
P-7	0.50	0.4	0.10	<0.01	<0.01
P-8	<0.01	<0.01	<0.01	<0.01	<0.01
P-11S	<0.01	<0.01	<0.01	<0.01	---
P-11D	<0.01	<0.01	<0.01	<0.01	---
P-12S	<0.01	<0.01	<0.01	<0.01	---
P-12D	<0.01	<0.01	<0.01	<0.01	---
P-13S	<0.01	---	<0.01	<0.01	---
P-13D	<0.01	<0.01	<0.01	<0.01	---
P-14U	<0.01	<0.01	<0.01	---	---
P-14L	0.50	0.1	<0.01	<0.01	<0.01
P-15U	<0.01	<0.01	<0.01	<0.01	<0.01
P-15L	<0.01	<0.01	<0.01	<0.01	---
P-16U	<0.01	<0.01	<0.01	<0.01	<0.01
P-16L	<0.01	<0.01	<0.01	<0.01	---

Chemical Analysis Reports
for Groundwater Removed During
Fuel Farm Remediation

Burmah

Neyer, Tiseo & Hindo, Ltd.
Attn: Robert Gorman

December 30, 1987

AMENDED REPORT

PROGRAM: A. C. SPARK PLUG - WELLS

Samples Received: 11-13-87

Samples Dated: 11-13-87

Sample Number	Client I.D.:	Benzene ug/l	Gasoline ug/l
30341	P-5	11,000	31,000
30342	P-6	<2	<100
30343	P-7	300	63,000
30344	P-11D	4	≤10[illegible]
30345	P-12S	<2	<[illegible]
30346	P-12D	12	<100
30347	P-13D	8	1000
30348	P-14L	170,000	330,000
30349	P-15L	4	26[illegible]
30350	P-16U	<2	<[illegible]
30351	P-16L	<2	<1[illegible]
303[illegible]	[illegible]	<2	<100

Susan K Scott
Laboratory Super[illegible]

Orig. [illegible]e: [illegible]2-17-87

We

Burmah
Burmah Technical Services, Inc.
Analytical Laboratories Division
408 Auburn Avenue
Pontiac, Michigan 48058
313-334-4747

Neyer, Tiseo & Hindo, LTD
38955 Hill Tech Drive
Farmington Hills, MI 48018
Attn: Robert Gorman

February 9, 1988

PROGRAM: AC SPARK PLUG-WELLS

Samples Dated: 1/13-14/88

Sample Numbers	Client I.D.	Benzene, ug/l	Gasoline, ug/l
32449	P-5	6600	9100
32450	P-6	<1	<100
32451	P-7	1600	7700
32452	P-11D	<1	<100
32453	P-12S	<1	<100
32454	P-12D	2	<100
32473	P13S	<1	<100
32455	P-14L	97,000	94,000
32456	P-15L	6	<100
32457	P-15U	5	<100
32458	P-16L	1	<100
32459	P-16U	3	<100
32460	East Sump	42,000	56,000
32461	West Sump	680	1,800
32462	Trip Blank	<1	<100

Susan K. Scott
Laboratory Supervisor

Wel/1L

Burmah
Burmah Technical Services, Inc.
Analytical Laboratories Division
408 Auburn Avenue
Pontiac, Michigan 48058
313-334-4747

Neyer, Tiseo & Hindo, LTD
38955 Hill Tech Drive
Farmington Hills, MI 48018
Attn: Robert Gorman

September 13, 1988

PROGRAM: AC SPARK PLUG WELLS

Date Received: 8-24-88

Sample Numbers	Client I.D.	Benzene, ug/l	Gasoline, ug/l
43240	P-5	<2	<50
43241	P-6	370	40,100
43242	P-7	<2	<50
43243	P-8	<2	<50
43244	P-9	<2	<50
43245	P-11D	<2	<50
43246	P-12D	20	<50
43247	P-12S	<2	<50
43248	P-13D	<2	<50
43249	P-13S	<2	<50
43250	14-L	36,400	<50
43251	15-L	<2	<50
43252	15-U	20	100
43253	P-16L	8	<50
43254	P-16U	37	<50

cc: C. R. Wendel, Dept. 26-58

Misc/2a

Susan K. Scott
Laboratory Supervisor

Burmah
Burmah Technical Services, Inc.
Analytical Laboratories Division
408 Auburn Avenue
Pontiac, Michigan 48058
313-334-4747

General Motors Corporation
AC Spark Plug Division
1300 N. Dort Highway
Flint, MI 48556
Attn: C. R. Wendel, Dept. 26-58

November 18, 1988

P.O.# N9189, Rel.# 424438

PROGRAM: TANK FARM RECOVERY PROJECT

Date Received: 10-28-88

ALD Number:	47156
Client I.D.:	Engineering Bldg. Well # P-14L 10-27-88
Gasoline, ug/l	120,000
Benzene, ug/l	119,000
Toluene, ug/l	160
Xylenes, ug/l	50

EPA Method 602

cc: Sue Kelsey, Dept. 26-55
Bill Schroeck, Dept. 26-58

Christopher P. Good
Laboratory Manager

TF/3L

Burmah

Burmah Technical Services, Inc.
Analytical Laboratories Division

408 Auburn Avenue
Pontiac, Michigan 48058

313-334-4747

General Motors Corporation
AC Spark Plug Division
1300 N. Dort Highway
Flint, MI 48556
Attn: C. R. Wendel, Dept. 26-58

November 18, 1988

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Toluene, ug/l	160
Xylenes, ug/l	50

EPA Method 602

cc: Sue Kelsey, Dept. 26-55
Bill Schroeck, Dept. 26-58

Christopher P. [illegible]

Laboratory Manager

TF/3L

General Motors Corporation
AC Spark Plug Division
1300 N. Dort Highway
Flint, MI 48556
Attn: C.R. Wendel,
Dept. 26-58

January 23, 1989

PROGRAM: QUARTERLY MONITORING WELLS At Engineering Building Tank Farm.

Date Received: 12/16/88 - 1/3/89

ALD Number:	50247	50248	50249	49967	49968	49969
Client I.D.:	P-8 1-3-89	P-9 1-3-89	P-10 1-3-89	P-11D 12-16-88	P-12D 12-16-88	P-12S 12-16-88
Benzene, ug/l	<2	<2	<2	<2	2	<2
Toluene, ug/l	<2	<2	<2	<2	<2	<2
Xylenes, ug/l	<2	<2	<2	<2	<2	<2

General Motors Corporation
AC Spark Plug Division
Attn: C.R. Wendel,
Dept. 26-58

January 23, 1989

PROGRAM: QUARTERLY MONITORING WELLS

Date Received: 12/16/88 - 1/3/89

ALD Number:	49970	50250	50251	49971	49972	50252	49973
Client I.D.:	P-13D	P-13S	P-14L	P-16L	P-16U	P-19	Bailer Blank
	12-16-88	1-3-89	1-3-89	12-16-88	12-16-88	1-3-89	12-16-88
Benzene, ug/l	2	<2	68,000	<2	<2	7100	<2
Toluene, ug/l	<2	<2	310	<2	<2	730	<2
Xylenes, ug/l	<2	<2	50	<2	<2	<2	<2

AC Rochester Division, GMC
Environmental Activities Dept.
1300 N. Dort Highway
Flint, MI 48556
Attn: C.R. Wendel, Dept. 26-58

April 24, 1989

PROGRAM: TANK FARM QUARTERLY MONITORING

Date Received: 4-3-89
Samples Dated 4-3-89

ALD Number:	54288	54286	54279	54282	54289	54287
Client I.D.:	P-8	P-9	P-10	P-11D	P-12D	P-12S
Benzene, ug/l	<2	<2	<2	3	<2	<2
Toluene, ug/l	<2	<2	<2	<2	<2	<2
Xylenes, ug/l	<2	<2	6	4	<2	<2

cc: Sue Kelsey, Dept. 26-55
Bill Schroeck, Dept. 26-58

qtly/1r

AC Rochester Division, GMC
Environmental Activities Dept.
Attn: C.R. Wendel, Dept. 26-58

April 24, 1989

PROGRAM: TANK FARM QUARTERLY MONITORING

Date Received: 4-3-89
Samples Dated: 4-3-89

ALD Number:	54285	54283	54280	54278	54281	54284
Client I.D.:	P-13D	P-14L	P-16L	P-16U	P-19	Trip Blank
Benzene, ug/l	3	75,000	<2	<2	75	<2
Toluene, ug/l	<2	550	<2	<2	4	<2
Xylenes, ug/l	<2	50	<2	<2	85	<2

Laboratory Manager

qtly/2r

Burman Environmental Services, Inc. (partially illegible)
Analytical Laboratories Division
40? Auburn Avenue
Pontiac, Michigan 48058
313/334-4747

AC Rochester Division, GMC
Environmental Activities Dept.
1300 N. Dort Highway
Flint, MI 48556
Attn: C.R. Wendel, Dept. 26-58

July 19, 1989

PROGRAM: TANK FARM QUARTERLY MONITORING

Date Received: 7-5-89

Samples Dated: 7-5-89

ALD Number:	58941	58942	58943	58944	58945	58946
Client I.D.:	P-8	P-9	P-10	P-11D	P-12D	P-12S
Benzene, ug/l	<2	<2	<2	<2	<2	<2
Toluene, ug/l	<2	<2	<2	<2	<2	<2
Xylenes, ug/l	<2	<2	<2	<2	<2	<2

cc: Sue Kelsey, Dept. 26-55
Bill Schroeck, Dept. 26-58

qtly/1L

Burmah

Burmah Technical Services, Inc.
Analytical Laboratories Division

408 Auburn Avenue
Pontiac, Michigan 48058

313/334-4747

AC Rochester Division, GMC
Environmental Activities Dept.
Attn: C.R. Wendel, Dept. 26-58

July 19, 1989

PROGRAM: TANK FARM QUARTERLY MONITORING

Date Received: 7-5-89

Samples Dated: 7-5-89

ALD Number:	58947	58940	58948	58949	58950	58951
Client I.D.:	P-13D	P-14L	P-16L	P-16U	P-19	Trip Blank
Benzene, ug/l	<2	60,000	<2	<2	35	<2
Toluene, ug/l	<2	600	<2	<2	<2	<2
Xylenes, ug/l	<2	70	<2	<2	60	<2

Christopher P. Gork

Laboratory Manager

qtly/2L

Burmah

AC Rochester Division, GMC
Environmental Activities Dept.
Attn: C. R. Wendel, Dept. 26-58

June 19, 1989

PROGRAM: ENGINEERING BLDG. TANK FARM REMEDIATION PROJECT

Date Received: 5-31-89

ALD Number:	57428
Client I.D.:	Well P-19 5-30-89
Gasoline, ug/l	450
Benzene, ug/l	<2
Toluene, ug/l	2
Xylenes, ug/l	150

EPA Method 8020

TF/2L

APPENDIX C

HAZARDOUS WASTE STORAGE TANK CERTIFICATION REPORT

FINAL REPORT FOR TANK TESTING AND TANK SYSTEM INTEGRITY ASSESSMENTS FOR AC SPARK PLUG DIVISION'S FACILITY IN FLINT, MICHIGAN

Submitted to:

General Motors Corporation
AC Spark Plug Division
Flint, Michigan

O.H. Materials Corp.

Robert J. Bourne
Project Manager, Midwest Region

January 25, 1988
Project 5626

FINAL REPORT FOR
TANK TESTING AND TANK SYSTEM
INTEGRITY ASSESSMENTS FOR AC SPARK PLUG
DIVISION'S FACILITY IN FLINT, MICHIGAN

Submitted to:

General Motors Corporation
AC Spark Plug Division
Flint, Michigan

This report has been reviewed and approved for conformity with acceptable engineering practices and federal regulations.

Feb 24, 1988
Date

Project 5626

R. Daniel B. Looper
General Manager, Engineering and Science
Ohio Engineer No. 51110

TABLE OF CONTENTS

1.0 INTRODUCTION

In November 1987, General Motor's AC Spark Plug Division (AC) of Flint, Michigan, selected O.H. Materials Corp. (OHM) to perform an extensive tank system integrity assessment for 11 tanks and integrity assessments on 22 additional tanks. This project was awarded in response to AC's RFQ No. 9225 and OHM's subsequent Proposal No. 87.01289 dated November 23, 1987. The project scope of work included testing tanks and lines and preparing a final report. This report is a portion of the final report and covers five tanks designated by AC as containing hazardous wastes and not having any secondary containment.

The project was initiated by AC as part of their overall environmental maintenance program and to be in compliance with new federal regulations. As stated in 40 CFR Section 264, "owners or operators of existing tank systems which do not have secondary containment meeting specific requirements must keep on file written assessments of the tank system's integrity, namely that the tanks are fit for use." Certified by an independent, registered professional engineer, the assessments must be completed and on file by January 12, 1988.

Due to the limited amount of time OHM had to complete the assessment and have it on file to AC by January 12, 1988, the assessment report was handled in two phases. The first phase involved preparing a rough draft reviewed and certified by an OHM registered professional engineer. The rough draft was completed and on file at AC by January 12, 1988. The second phase, preparation of a final report, is incorporated herein. This report takes into account corrections made by AC on their tank systems following our tank assessment. These corrections allowed some of the tank systems to be considered structurally sound and fit for use. The revised final report has also been reviewed and certified by OHM's registered professional engineer.

1.1 CONTENT

This report contains information on the five tanks which contain hazardous wastes, as determined by AC. Each assessment of the tank's structural integrity and acceptability is based on information in 40 CFR Section 264.191 and includes the following:

- o Written, certified assessment that attests to the tank system's integrity.
- o Determination of adequate design, sufficient structural strength, and compatibility of construction material with the waste(s) to be stored or treated, based on the leak test and

construction design standards. In addition, the hazardous characteristics of the wastes, tank age, and corrosion protection measures are considered.

- As required in the Environmental Protection Agency's (EPA) regulation, the assessment was reviewed and certified by an independent, registered professional engineer. During the engineer's review of the assessment, equal consideration was given to the available facts provided by AC and the visual/physical review by the on-site assessment crew. This certification becomes invalid if any changes are made to the tank or the ancillary equipment.

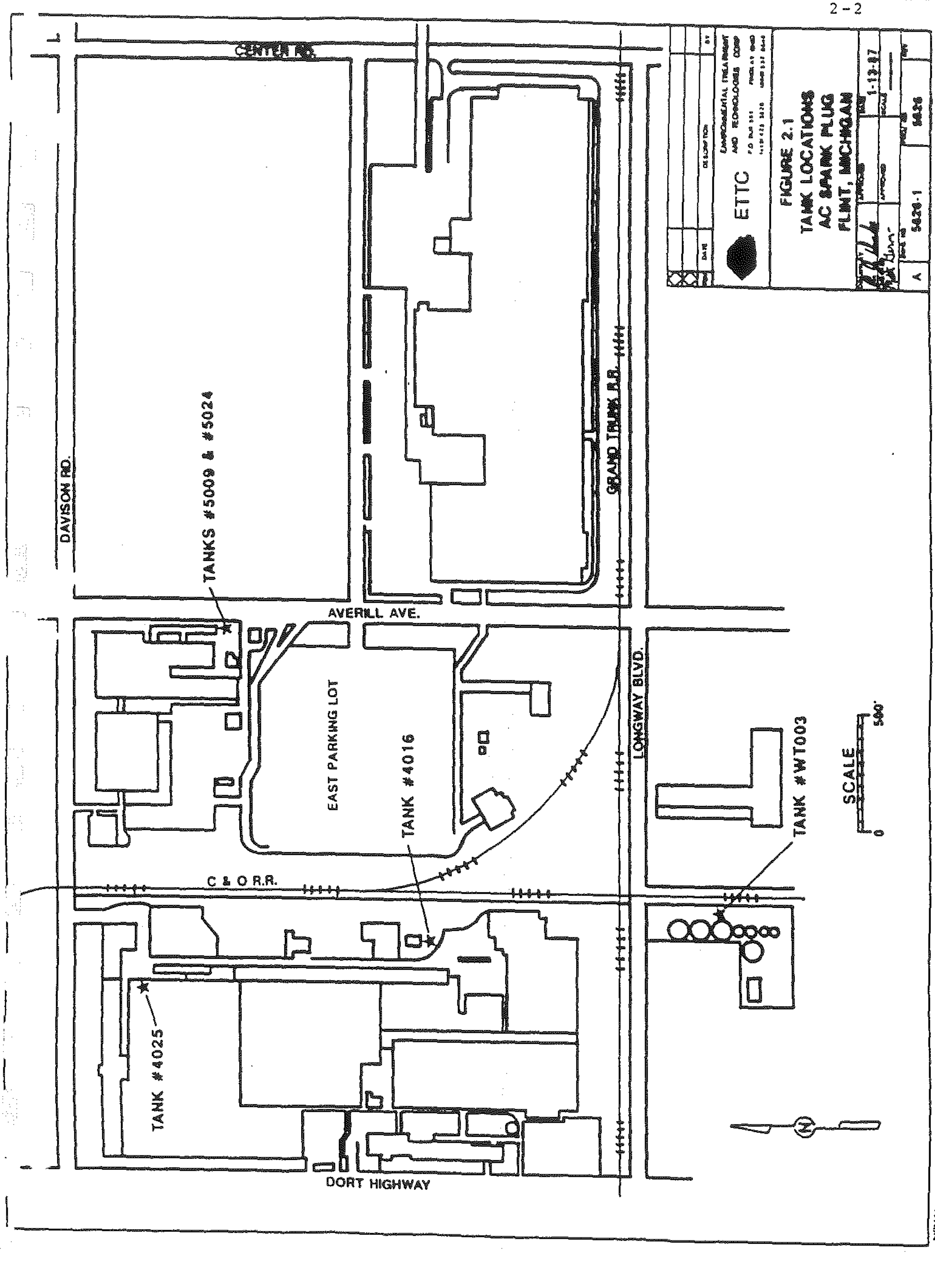
This report describes the following five tanks:

AC Tank Number	Tank Contents
WT 003	Waste Oil
4016	Waste Oil
4025	Waste Stoddard Solvent
5009	Scrap Fuel
5024	Waste Oil

2.0 SITE BACKGROUND

The AC facility manufactures spark plugs and air and fuel filters, and is located in the southeast area of Flint, Michigan, in Genessee County, Michigan. The site topography is generally flat and consists of glacial till deposits of sand and gravel, with some clay lenses.

The locations of the tanks described herein are shown on Figure 2.1.


CENTER RD.
DAVISON RD.
TANKS #5009 & #5024
GRAND TRUNK R.R.
AVERILL AVE.
EAST PARKING LOT
TANK #4016
LONGWAY BLVD.
TANK #WT003
SCALE
0
500'
C & O R.R.
TANK #4025
DORT HIGHWAY
N
ETTC
ENVIRONMENTAL TREATMENT AND TECHNOLOGIES CORP
FIGURE 2.1
TANK LOCATIONS
AC SPARK PLUG
FLINT, MICHIGAN
1-13-87

3.0 PETRO-TITE TEST

AC's tanks were precision tested using the Petro-Tite test method (formerly known as the Kent-Moore test method). The Petro-Tite test is the most widely accepted tank-testing procedure. The test takes into consideration all variables during a precision test, including temperature, product circulation, ground-water counter pressure, tank-end deflection, and removal of trapped air pockets.

3.1 TEST PROCEDURES

The test measures the change in volume at a uniform hydrostatic pressure over equal time periods. Volume changes attributed to pressure or temperature changes within the tank system are measured and corrected so that a net volume change over time is recorded. A summary of the Petro-Tite test procedure follows:

1. Depth to ground water in tank backfill is measured. Counter pressure affects exerted onto the tank from a high water table are compensated for by raising the level of the tank-tester standpipe. This ensures that tank ends will be allowed to fully deflect.

2. All tank and line appurtenances are capped and sealed for the test. Air bleeder valves are installed wherever air could be trapped in the system.

3. The Petro-Tite test apparatus is assembled and water is added until the tank is completely full and the desired level of fuel in the tester standpipe is reached.

4. Product is circulated within the tank system to remove temperature layering. Circulation within the tank system and test equipment mixes the product so one average temperature can be measured with the thermal sensor.

   The high liquid level in the standpipe is maintained during circulation to ensure that maximum tank-end deflection occurs. Because the tanks change shape and volume under the hydrostatic head pressure during the test, these volume changes must be measured throughout the test.

5. A representative sample of water is removed from the system and the thermal coefficient of expansion is measured and recorded.

6. Test measurement begins when tank ends have fully deflected and hydraulic head can be reduced. Both product temperature and product volume changes are recorded at 15-minute intervals.

7. Volume changes caused by temperature effects are corrected by using the product coefficient of thermal expansion. Gross volume changes are adjusted to actual net volume change by subtracting expansion or contraction caused by temperature change.

8. A value for actual net volume change over 1 hour is obtained for the tank system. It is widely accepted by most authorities, including the NFPA, that a tank is "tight" if the measured net change in volume is less than 0.050 gallons per hour (gph). The 0.050-gph value should be considered a precision tolerance; it is not meant to indicate the permission of any leak.

4.0 TANK ASSESSMENTS

The following information discusses the five tank assessments. Each section begins with an overview of the tank system, including the process flow and visual observations made by the field assessment crew. This overview is followed by facts obtained from AC on each of the tank systems, including facts on the design standards used during construction, hazardous characteristics of the tank's contents, existing corrosion measures, documented age, and results of the leak test(s). Our opinions on the structural integrity of the tank systems and their condition for continued use is also detailed.

A summary of the tank assessments is included below:

Tank Number	Assessment	Primary Reason(s)
WT 003	Fit for use	
4016	Unfit for use	Tank condition not suitable for storing hazardous wastes
4025	Fit for use	
5009	Fit for use	
5024	Fit for use	

4.1 TANK WT 003

This tank system is used to store waste oil at AC's wastewater-treatment facility. The facility contains both a 320,000 gallon clarifier and 600,000 gallon cyclator used for wastewater clarification. These units have rotating oil skimmers which remove oil from the water's surface.

The oil gravity feeds from each skimmer into a single 6-inch mild steel drain line. A 6-inch drain pipe extends from the top of both the clarifier and cyclator and runs down the outside of each holding tank before entering the ground. The pipes then join together and enter Tank WT 003 as one line approximately 40 feet away. This 6-inch pipe is noted as the drain pipe.

4.1.1 Tank Description

After the oil separates in Tank WT 003, the water is returned to the clarifier through a 2-inch mild steel pipe which extends from the tank bottom through the middle of the tank and continues underground to the pumping station located approximately 20 feet away. The pumping station is located directly beside the clarifier. Water from the 2-inch return pipe is pumped from the station, over the top, and into the clarifier.

Two other pipes from the tank are the vent pipe and the waste oil removal lines. The vent pipe runs underground about 15 feet away from the tank where it rises above grade approximately 15 feet. The oil removal line rises directly off the tank to grade. A 3-inch steel pipe with a male OPW fitting lies at grade inside an 8-inch steel riser pipe. AC contracts a local company to periodically remove the waste oil.

A concrete observation pit, measuring approximately 5 feet by 6 feet from tank top to grade, allowed the field assessment crew to visually inspect the tank top. A 1 1/2-inch-diameter steel pipe was threaded into the tank top using pipe thread sealant. Extending to grade level, the top of the pipe is capped with a 1 1/2-inch male OPW and a 1 1/2-inch OPW cap. This pipe is used as a stick port in order to check the levels of the tank's contents. The OPW cap is removed and the measuring stick is lowered into the stick port pipe to obtain an indication of the level of the tank contents. The OPW cap is then placed back onto the male OPW for the proper seal.

The tank is thought to have a 5,000-gallon capacity (no records are available) with dimensions of 96 inches in diameter and 13 feet, 6 inches in length. The tank is constructed of mild steel which is compatible with the tank contents. The tank burial depth is 64 inches below grade, with top soil and the observation pit as the overburden. The tank dimensions are an estimate obtained by the OHM Petro-Tite tank testing crew using common tank charts.

4.1.2 Construction

There are no records available of the tank manufacturer, so national design standards cannot be referenced for structural integrity assessment of the tank. Blueprints to show the dimensions, wall thickness, or openings on this tank to assess the structural integrity of the tank are also unavailable.

The installation records for the ancillary equipment on the tank system could not be located; therefore, we are unable to determine whether national design standards were followed. Blueprints on the ancillary equipment are also unavailable, so the pipe gage is unknown. Based on field observations, the ancillary pipes are constructed of mild steel which is compatible with the tank contents.

4.1.3 Contents

Hazardous characteristics of the tank contents are listed in the analytical report prepared by Clow Hydro Research Services in January 1985, and found in Appendix A. The contents are compatible with mild steel.

4.1.4 Assessment Results

The following results are reported:

- o Corrosion protection: none
- o Volumetric leak test on tank including vent line and 6-inch drain line (performed August 18, 1986, by OHM; see Appendix C): -0.041 gph (certifiable at time of test) *Refer to 5,000-gallon Wastewater Treatment Tank
- o Return line (2 inch) volumetric leak test: -.00005 gph. (certifiable at time of test)
- o Tank age: estimated to be 32 years. This estimate is based on the age of the facility where the tank is located.

The aboveground ancillary equipment pipes are inspected daily by AC employees.

Upon review of the test results and field crew inspection, OHM judges Tank WT 003 as fit for use. The following reason is cited:

- o The tank test is within the hourly leak rate accepted by the EPA

4.2 TANK 4016

This tank is used for dumping waste oil from the general area of Complex 4.

4.2.1 Description

There are two open areas on top of Tank 4016. One opening is approximately 12 inches in diameter. A large sheet-metal funnel rests in this opening for the hand-dumping of waste oil. The funnel extends approximately 12 inches below grade where it enters a riser pipe coming off the tank top. The riser pipe extends approximately 24 inches above the tank top, but 12 inches below the concrete containment overburden.

A second opening, approximately 6 inches in diameter, has a riser pipe off of the tank top to grade. The tank does not have a vent pipe.

A 2-inch pipe originating at the tank bottom passes through the 6-inch opening over to a self-priming centrifugal pump. This aboveground pump removes the water phase from below the oil in the tank and discharges it into a nearby process sewer which leads to AC's wastewater-treatment plant. A second pipe which ends inside the 6-inch opening is connected to a Sandpiper diaphragm pump. This pump is part of a system set up by AC which vacuums the oil out of waste oil drums and discharges it into the tank.

The discharge line on the Sandpiper pump has another 2-inch line branching off of it. This line runs up a support beam and across the ceiling for approximately 300 feet. The 2-inch line enters a paint room where it descends the wall to approximately 4 feet off the floor. This line now has a permanent cap over it, but is used to remove waste oil in the winter months from drums in the paint room.

The tank is located in a drum staging area with a roof over the entire area. The tank is buried 36 inches below grade with concrete overburden. The tank is thought to be 96 inches in diameter and 27 feet in length. These dimensions are an estimate obtained by the OHM Petro-Tite tank testing crew using common charts.

4.2.2 Construction

There are no records of the tank manufacturer, so national design standards cannot be referred to for structural integrity of the tank. Blueprints showing the materials of construction, dimensions, wall thickness, or openings on this tank are also not available to assess the structural integrity of the tank.

There are no records of who installed the ancillary equipment on the tank system; therefore, we cannot determine whether national design standards were followed. The ancillary equipment is constructed of mild steel. All known plumbing for Tank 4016 is above ground.

4.2.3 Contents

The waste oil characteristics were listed in a laboratory report by the Analytical Laboratories Division of Burnah Technical Services, Inc. in Pontiac, Michigan, dated June 8, 1987. A copy of the report is included in Appendix A.

4.2.4 Assessment Results

The following test results are reported:

- o Corrosion protection: none
- o Age: unknown, but estimated to be 10 years based on the age of the drum pad where the tank is located
- o Volumetric leak test on tank (performed August 13, 1986, by OHM; see Appendix C): -0.032 gph (certifiable at the time of the test)
- o No volumetric tests on the ancillary pipes

Since all known plumbing is above ground, it is inspected daily by AC employees.

Tank 4016 is judged unsuitable for use.

4.3 TANK 4025

This system is used to collect waste solvent used for cleaning miscellaneous parts and tools in Complex 4, Building 4100.

4.3.1 Description

There are two dump stations located inside Building 4100. The two stations are metal-fabricated pits approximately 2-inches deep with steel grates covering them. Each station has a 3-inch drain connected to 3-inch Schedule 40 pipe. The pipe lies under the floor where the two drains join before entering the tank (approximately 30 feet). The 3-inch Schedule 40 return line is gravity fed with a minimum slope of 1/4-inch per foot.

The remainder of the plumbing on this tank consists of a 2-inch suction line running from the tank bottom to the tank top, continuing 3 inches above ground with an OPW fitting attached. The suction line is where the contracted oil recycling company removes the oil from the tank. It should be noted that the suction line showed a lot of movement, indicating it was loose. OHM feels the movement in the line was due to the use of a rubber section of 2-inch suction hose which was used as a coupler in order to prevent the line from being broken from possible stress applied to it by the recycling contractors. The rubber hose was attached to the pipe above ground by use of a hose clamp. It is unknown how the rubber hose is attached to the pipe below the ground. A Red Jacket pump was also installed on the tank top, but it is unknown if any lines run off of this pump.

The tank is located next to a loading dock outside Building 4100. The tank top is 32-inches below grade with a sand and concrete overburden. The tank area is secured so traffic cannot drive over the tank. The tank has a 3,000-gallon capacity with dimensions of 72 inches in diameter and 13 feet 6 inches in length. These dimensions are documented on the manufacturer's blueprint.

A blueprint of the tank system is maintained by AC. The print shows the feed pipe into the tank from the waste solvent dumping station. The blueprint does not show the vent pipe, the original fill pipe, or any plumbing that may exist from the Red Jacket pump installed in the tank.

4.3.2 Construction

The tank was manufactured by Clawson Tank Company, Clarkston, Michigan, per Underwriters Laboratory (UL) specifications, Document Number 58. Ancillary equipment design standards are unavailable. The tank and ancillary equipment is constructed of mild steel which is compatible with the tank contents.

4.3.3 Contents

Tank 4025 contains waste or spent stoddard solvent. Stoddard solvent is a widely used solvent, especially for dry cleaning. The United States Bureau of Standards and ASTM D484-52 define it as a petroleum distillate, clear and free from suspended matter and undissolved water and free from rancid and objectionable odor. The minimum flash point is 100 degrees Fahrenheit. Insoluble in water, it is miscible with absolute alcohol, benzene, ether, chloroform, carbon tetrachloride, carbon disulfide, and oils except castor oil. It is also called white spirits.

Analyses of the tank contents in April 1986, showed that it contained low levels of metals. The complete report by Barmah Technical Services Inc., Pontiac, Michigan, is included in Appendix A.

4.3.4 Assessment Results

The tank is protected from corrosion in the following ways:

- Electrical isolation of all openings
- The tank exterior received a SSPC-SP-6 grade sand blast followed by one multi-pass coat of Corrocate II polyurethane coating applied to heads at 15 mils D.F.T. and shell at 10 mils D.F.T.

- o Cathodic protection provided by use of sacrificial magnesium anodes wired to tank heads

The following assessment test results are reported:

- o Age: 3 years, documented from a blueprint
- o Volumetric leak test of tank, including vent, original fill, and 6 feet of return line from the tank top to Complex 4 (performed August 20, 1986, by OHM; see Appendix C): -0.046 gph (certifiable at the time of the test)
- o Volumetric leak test of feed line from the wall of Complex 4 to the two dumping stations inside the building: -0.0036 gph (certifiable at the time of the test)

As noted, Tank 4025 is newer than the previous two tanks discussed. Based on the leak test results, the tank, return line, vent, fill, and suction pipes are not leaking. The tank design specifications are known; however, information does not exist on the ancillary equipment installation. The tank system is structurally sound at this time and is considered fit for use.

4.4 TANK 5009

This system is used for collecting waste fuels created during fuel pump testing at the Engineering Building in Complex 5. The tank is located in a tank farm adjacent to Building 5114 in Complex 5.

4.4.1 Description

Ancillary equipment includes the return line that begins at the tank top and is plumbed into an open 4- by 4-foot concrete trench. This concrete-lined trench extends an estimated 100 feet then turns 90 degrees and runs another estimated 300 feet next to Complex 5. The return pipe ends in a 15-foot high vent pipe. Flow to the tank can be visually monitored by AC through the steel grates that cover the trench.

The trench's primary purpose is to contain the fuel lines feeding the test cells in nearby facilities. The trench is set up throughout its entire length with a vapor detection system manufactured by the United States Riley Corp., Panalarm Division, Skokie, Illinois. The system is engineered to trigger an alarm if vapors present in the trench reach 10 percent of the lower explosive limit (LEL), and shuts down the entire tank farm if 60 percent of the LEL is reached. The trench has corrugated steel grating over it so the entire trench may be visually inspected. There are three locations where lines "T" off the return line to enter the test lab in Building 5113. These three locations in Building 5113 are where the scrap fuel enters the system. All pipes in the test cells are above ground and visually inspected daily by AC.

The burial depth of the tank is 32 inches from the tank top to grade, with sand as an overburden and as a backfill. The tank area is secured so traffic may not drive over the tank. The tank has a 2,000-gallon capacity with dimensions of 64-inches in diameter and 12-feet in length. These dimensions are documented on the manufacturer's blueprint.

4.4.2 Construction

The tank and ancillary equipment are constructed of mild steel. The tank was manufactured by Clawson Tank Company following the UL specification Document Number 58. Ancillary equipment design standards have not been located by AC and will be considered unavailable.

A 2-inch vent pipe runs off the tank top, underground to a proper location 20 feet away, where it rises 15 feet above grade. A 3-inch fill pipe also comes off of the tank top and travels approximately 50 feet underground to a loading station. The fill pipe is not used at this time. AC stated they will disconnect the fill pipe line from the tank and place permanent caps on the ends. A 2-inch pipe runs from the inside tank bottom to grade and has a 2-inch OPW fitting attached. This line is used by the contracted oil recovery firms to remove waste fuel from the tank.

4.4.3 Contents

Planned AC use of the tank includes the following components:

Fluid	Quantity (gal/mo)
Stale Gas	150
Ethanol	20
Isobutanol	3
Methanol	25
Toluene	10
Iso-Octane	10
Tert-Butyl Hydroperoxide	1
Tert-Butyl Disulfide	1
Absolute Ethanol	1
Di-Isobutylene	5
Formic Acid	1
Thiophene	1
Methyl Tertiary	1
Iso-Propyl Alcohol	1

Fluid	Quantity (gal/mo)
Diesel Compliance Fuel	10
Stoddard Solvent	100
N-Pentane	200
L4264B Test Fluid	20
Waste Oil	7
Solax	4
Heater Oil	2
Depolarized Test Fluid	2
Tap Water	3

An analysis of the tank contents is included in the Burmah Technical Services Inc. report dated October 16, 1986, included in Appendix A.

4.4.4 Test Results

Corrosion protection of the tank is provided by the following:

- o Electrical isolation of all openings
- o Exterior received a SSPC-SP-6 grade sandblast followed by one multi-pass coat of Corrocate II polyurethane coating applied to heads at 15 mils D.F.T. and shell at 10 mils D.F.T.
- o Cathodic protection provided by use of sacrificial magnesium modes wired to tank heads

The following assessment test results are reported:

- o Age: 4 years, documented from a blueprint
- o Volumetric leak test of tank and feed line: +0.007 gph (certifiable at the time of the test)
- o Results of volumetric (Petro-Tite) tank test of the ancillary equipment are as follows:
  - The 3-inch fill line cannot be tested due to air pockets in the line. The fill pipe is connected to the loading station. AC intends to isolate this line from the system in a proper manner.
  - Return line from tank to West trench (20 feet of line): -.0070 gph (certifiable at the time of the test)

- Vent pipe: -.0260 gph (certifiable at the time of the test)

- For the three lines that "T" off the return line:

  North line/Cell Room No. 4: -.0065 gph (certifiable at the time of the test)

  Middle line/Cell Room No. 3: -.0075 gph (certifiable at the time of the test)

  South line/Cell Room No. 2: -.0090 gph (certifiable at the time of the test)

Tank 5009 is judged suitable for use.

4.5 TANK 5024

This tank is used to store waste oil generated during engine testing, plus general waste oils generated from the Engineering Building in Complex 5.

The tank is located on the south side in the east fuel trench. The trench is surrounded by concrete and measures approximately 6-feet wide by 8-feet deep by 200-feet long. The primary purpose of the trench is to contain the fuel lines from tank farms feeding the test cells in nearby facilities. The trench is set up throughout its entire length with a vapor detection system manufactured by the United States Riley Corp., Panalarm Division, Skokie, Illinois. The system is engineered to trigger an alarm if 10 percent of the LEL in the trench is reached, and shuts down the entire tank farm if 60 percent of the LEL is reached. The trench is covered with corrugated steel grating so the entire trench may be visually inspected.

4.5.1 Description

Ancillary equipment includes one return pipe that extends from the tank top, underground, and into the Dyno Building (approximately 30 feet) where waste oil is pumped into the system.

Because the tank is lying in the open east trench, it has no surrounding backfill and all ancillary equipment can be visually inspected.

The other plumbing on the tank is a 2-inch vent pipe which rises 10 feet above grade directly off the tank top and a 2-inch remote suction line. Both lines are contained in the east trench and visually monitored on a daily basis by AC. The vent pipe rises directly off the tank top by 10 feet and then is plumbed 180 degrees back into the trench area where it ends in order to contain any discharges which may occur. The suction line rises 2 feet off the tank top then extends horizontally to the end of the trench approximately 15 feet. The suction line is used for removing waste oil from the tank by a local contractor and feeding waste oil into the tank from drums by AC.

The tank sits in the trench with the top approximately 2 feet below grade. There is no traffic on or around the tank. The tank is a 1,000-gallon capacity with dimensions of 48 inches in diameter and 12 feet in length. These dimensions are documented on the manufacturer's blueprint.

4.5.2 <u>Construction</u>

Manufactured by Clawson Tank Company in accordance with UL specifications listed in Document Number 58, the tank and ancillary equipment are constructed of mild steel. Ancillary equipment design standards have not been located by AC and will be considered unavailable. The tank and ancillary equipment materials of construction are compatible with the tank contents.

4.5.3 <u>Content</u>

In a laboratory report from July 6, 1987, Burmah Technical Services Inc. analyzed the tanks waste oil. Their report is included in Appendix A.

4.5.4 <u>Test Results</u>

As in other recent tank installations, Tank 5024 is protected from corrosion by the following:

- o Electrical isolation of all openings
- o Exterior received a SSPC-SP-6 grade sandblast followed by one multi-pass coat of Corrocote II polyurethane coating applied to the heads at 15 mils D.F.T. and shell at 10 mils D.F.T.
- o Cathodic protection provided by use of sacrificial magnesium modes wired to tank heads.

The following assessment test results are reported:

- o Age: 2 years per blueprint
- o Volumetric leak test of tank including the suction and vent pipes: -0.041 gph (certifiable at the time of the test)

The documentation provided on the tank design and leak detection methods on this system are favorable. Along with other general information and the Petro-Tite tank test showing the tank system to be tight at this time, the tank system is considered structurally sound and fit for use.

5.0 CONCLUSIONS

A thorough tank assessment of the five tanks which AC uses to store hazardous wastes (in accordance with the 40 CFR 264.191 regulations) has been completed by OHM. Based on OHM's extensive past experience and knowledge of underground storage tanks, OHM concludes that Tank 4016 should be removed from service as a hazardous wastes tank. Tank Nos. WT003, 4025, 5009, and 5024 are suitable for use at this time.

TANK 5024

TANK TEST

petro Tite TANK TESTER

OHM PROJECT NO. M091

SERIAL NO. OF TEST UNIT

PLEASE PRINT

1. AC Sparkplug — Flint — Mich

2. TANK TO TEST: 5024 — Dump tank

3. CAPACITY: Nominal Capacity 2000 Gallons. By most accurate capacity chart available 2005 Gallons.
Is there doubt as to true capacity? ☐ See Section DETERMINING TANK CAPACITY

From:
- ☐ Station Chart
- ☒ Tank Manufacturer's Chart
- ☐ Company Engineering Data
- ☐ Charts supplied with petro Tite
- ☐ Other

4. FILL-UP FOR TEST

Stick Water Bottom before Fill-up: — —

Depth of Groundwater: 134" to water. Hgt Above Grade - Low Level: 40"

Tank Diameter: 64"

Product in full tank (up to fill pipe)

	Stick Readings to ⅛ in.	Total Gallons
Inventory		2005
Water		
Equiv. Allow.		+ 3
Grand Total Gallons		2008

5. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

Vapor Recovery System ☐ Stage I ☐ Stage II

☐ Water in tank ☐ High water table in tank excavation ☐ Line(s) being tested with LVLLT

API Hydrometer - Gravity 55.9
Product Temperature 32
API/60°F - Table "A" 59.3
Coefficient Expansion - Table "B" .00060863

6. TANK MEASUREMENTS FOR TSTT ASSEMBLY

Bottom of tank to Grade*: 113"
Add 30" for 4" L
Add 24" for 3" L, or air seal
Total tubing to assemble Approximate: 180"

7. EXTENSION HOSE SETTING: 48"

*If fill pipe extends above grade, use top of fill

8. TEMPERATURE/VOLUME FACTOR (s) TO TEST THIS TANK.

9. Thermal-Sensor reading after circulation: 4934 — 36·37 = 1066

10. Digits per °F in range of expected change: 297

11. 2008 × .00060863 = 1.222129 gallons
(Total quantity in full tank (16 or 17) × Coefficient of expansion for involved product (Table B) = volume change in this tank per °F)

12. 1.222129 ÷ 297 = .0041149
(Volume change per °F (11) ÷ Digits per °F in test range (10) = Volume change per digit. Compute to 4 decimal places. This is test factor (s))

14 Time (24 hr)	15 Record details of setting up and running test. (Use full length of line if needed.)	16 Reading No.	17 Hydrostatic Pressure Control: Standpipe Level in inches — Beginning of Reading	Level to which Restored	19 Product in Graduate — Before Reading	After Reading	20 Product Replaced (−) / Product Recovered (+)	22 Thermal Sensor Reading	23 Change Higher (+) Lower (−)	24 Compensation (s) × (c) = Expansion + Contraction −	25 Net Volume Changes Each Reading	26 Accumulated Change
1000	TB, BC Arrived at Engineering bld tank farm. Plumbers have connected vent lines and gravity return lines to tank system, leaving remote fill line off.											
1030	We began setup and asked to have line to tank #9 broken in trench under walkway											
1130	Tank #8 is missing a 2½" plug on tank top, plumbers still trying to locate one with Nylon seal. JK asked if we could drill and tap manway on 5024 after they removed it, said we would.											
1300	Unable to begin test on tank #8 due to delays of Nylon seated 2½" plug											
1310	Began Circulation											
1255	Initial Reading	1		42		1.00		4934	Factor	A	.0041	
		2	40.4	42	1.00	.840	−.160	940	+6	+.025	−.185	
		3	40.7	42	.840	.710	−.130	945	+5	+.021	−.151	
		4	40.9	42	.710	.600	−.110	951	+6	+.025	−.135	
		5	41.4	42	.600	.550	−.050	960	+9	+.037	−.087	
		6	41.7	42	.550	.525	−.025	964	+4	+.016	−.041	
	Drop to low level											
		7	12.9	12	.525	.575	+.050	969	+5	+.021	+.029	
		8	12.3	12	.575	.590	+.015	973	+4	+.016	−.001	.041 GPH
		9	12.2	12	.590	.600	+.010	979	+6	+.025	−.016	
		10	12	12	.600	.600	+.000	985	+6	+.025	−.025	
		11	12	12	.600	.600	+.000	985	+0	+.000	+.000	

NOTE:

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

T. Bash — BRIAN Conlay — Technicians

OHM THE ENVIRONMENTAL SERVICES COMPANY, O.H. MATERIALS CORP, CORPORATE HEADQUARTERS FINDLAY OHIO

T. C. Bash — By Signature

12/10/84

TANK 5009

TANK TEST

RETURN LINE FROM TANK
TO WEST TRENCH

NORTH LINE

VENT LINE

MIDDLE LINE

SOUTH LINE

SHEET ____ OF ____

Data Chart for Tank System Tightness Test

petro tite
TANK TESTER

5626
OHM PROJECT NO.
M091
SERIAL NO. OF TEST UNIT
1-12-88

PLEASE PRINT

1 AC Spark Plug — Flint — Michigan — 1-12-88

2 TANK TO TEST: Tank #5009 · Engineering test area — Waste oil tank test w/Unleaded Fuel

3 CAPACITY: Nominal Capacity 2,000 — By most accurate capacity chart available 2,005 Gallons

From: ☐ Storage Chart ☒ Tank Manufacturer's Chart ☐ Company Engineering Data ☐ Charts supplied with petro tite ☐ Other

Is there doubt as to True Capacity? ☐ See Section "DETERMINING TANK CAPACITY"

4 FILL-UP FOR TEST

Stick Water Bottom before Fill-up: 0 (to ⅛ in.) 0 Gallons

Depth of Groundwater: 137

Hgt. Above Grade - Low Level: 40"

Tank Diameter: 64"

Product in fill tank (up to fill pipe)

Stick Readings to ⅛ in.	Total Gallons
Inventory	2,005
Water	0
Equip. Allow.	3
Grand Total	2,008
Gallons	

5 SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

Vapor Recovery System ☐ Stage I ☐ Stage II

☐ Water in tank ☐ High water table in tank excavation ☐ Line(s) being tested with LYLLT

API Hydrometer - Gravity: 56.7
Product Temperature: 38°F
API/GPF - Table "A": 58.4
Coefficient Expansion - Table "B": .00060934

6 TANK MEASUREMENTS FOR TSTT ASSEMBLY

Bottom of tank to Grade*: 113
Add 30" for 4" L
Add 24" for 3" L or air cool
Total tubing to assemble Assessment: 180

7 EXTENSION HOSE SETTING: 48

* N.B. ... above grade ... top of fill

8 TEMPERATURE/VOLUME FACTOR (a) TO TEST THIS TANK

9 Thermal-Sensor reading after circulation: 04056 — 32/33 — 1066

10 Digits per °F in range of expected change: 294

11 2,008 (Total quantity in full tank (16 or 17)) × .00060934 (Coefficient of expansion for involved product (Table B)) = 1.2235547 (Volume change in this tank per °F)

12 1.2235547 (volume change per °F (24)) ÷ 294 (Digits per °F in test Range (23)) = .0041618 (Volume change per digit. Compute to 4 decimal places.)

14 Time	15 Record details of setting up and running test. (Use full length of line if needed.)	16 Reading No.	17 Hydrostatic Pressure Control: Beginning of Reading	17 Level to be Restored	19 Product in Graduate: Before Reading	19 After Reading	20 Product Replaced (+) or Recovered (−)	22 Thermal Sensor Reading	23 Change Digits + or −	24 Computed (+ or −)	25 Net Volume Change	26 Accumulated Change
	All lines broken at tank top. Testing tank only. Temperatures started the day approx. 30°F + seemed to rise as the day progressed. Tank top exposed.											
1700	Begin Circulation									.0042		
1710	Initial Reading	1		42		.940		04056				
1725		2	42.5	42	.940	.960	+.020	020	-36	-.151	+.171	
1740	Adjusted jet direction	3	43.4	42	.900	.960	+.060	028	+8	+.034	+.026	
1755		4	44.0	42	.700	.780	+.080	040	+12	+.050	+.030	
1810		5	43.3	42	.780	.840	+.060	052	+12	+.050	+.010	
1825		6	43.7	42	.840	.905	+.065	071	+19	+.080	-.015	
	Drop to Low Level			12			Digits per °F	Change - NO CHANGE TO	FACTOR A			
1840		7	13.6	12	.110	.170	+.060	084	+13	+.055	+.005	
1855		8	13.9	12	.170	.240	+.070	102	+18	+.076	-.006	
1910		9	14.0	12	.240	.320	+.080	120	+18	+.076	+.004	+.007/hr.
1925		10	13.8	12	.320	.390	+.070	136	+16	+.067	+.003	
1940		11	13.8	12	.390	.455	+.065	150	+14	+.059	+.006	"Tight"

NOTE:

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as "Tight" - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

B. Conley
T. Bush
Technician

OHM
THE ENVIRONMENTAL SERVICES COMPANY
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS FINDLAY, OHIO

Brian M. Conley
By: Signature
122110705
Technician Certification No.

TANK TEST

OHM

O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

OHM PROJECT NO. 162ke

SERIAL NO. OF TEST UNIT

RETURN LINE FROM TANK TO WEST TRENCH

Owner: Name / State / City / State LOCATION

DATE OF TEST: Year 88 Mo. 1 Day 12

1 LOCATION: AC Sparkplug (Street No. and/or Corner) Flint (City) Mich (State) Telephone No.

2 OWNER: Engineering Bld: Tank Farm (Name / Address / Representative / Position) Telephone No.

3 OPERATOR: Name / Dealer, Mgr. or Other / Address (If different than Location) / Telephone No.

4 REASON FOR TEST

5 TEST REQUESTED BY: Can only see approx. 2' of each end of line; overall 25' (Name / Position / Order No. / Billing Address)

6 SPECIAL INSTRUCTIONS: 2" line capped at tank & in Trench

7 COVER OVER LINES Sand (CONCRETE, ASPHALT, ETC) APPROXIMATE BURIAL DEPTH 30"

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☒ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS 2" dumpline Tank #9

10 WEATHER Cold 19° TEMPERATURE IN TANKS ____ °F ____ °C

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	14 PRESSURE psi OR kPa AFTER	15 VOLUME READING BEFORE	15 VOLUME READING AFTER	15 VOLUME NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
2" dump line tank #9, from tank to trench.								
	1745			30		.0750		
	1800		8	30	.0750	.0715	-.0035	-.0070 Tight
	1815		8	30	.0715	.0700	-.0015	
	1830		9	30	.0700	.0690	-.0010	
	1845		9	30	.0690	.0680	-.0010	
								Bleed back .0068 = .0069

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

By: Signature T. Beck
Technicians Certification No. 12211018

Tim Beck
Brian Conley
Technicians

OHM
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS: FINDLAY, OHIO
800-537-9540 (24 Hours)

OHM

O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

5626
OHM PROJECT NO.

MLT-07
SERIAL NO. OF TEST UNIT

1 LOCATION: AC GM SparKpluG (Street No. and/or Corner) Flint (City) Mich (State) Telephone No.

2 OWNER: Name Address Representative Position Telephone No.

3 OPERATOR: Name Dealer, Mgt. or Other Address (If different than Location) Telephone No.

4 REASON FOR TEST: Gas test CELL Room #4 2" dump line to tank #9

5 TEST REQUESTED BY: Tested with Gas (Name) Position Order No. Billing Address

6 SPECIAL INSTRUCTIONS: of 3 lines this line is the North Line

7 COVER OVER LINES: Concrete Floor (CONCRETE, ASPHALT, ETC) APPROXIMATE BURIAL DEPTH: 10" inside bld.

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☒ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS: N/A

10 WEATHER ______ TEMPERATURE IN TANKS ____ °F ____ °C

OWNER: Name

LOCATION: State City State

DATE OF TEST: Year Mo. Day

NORTH LINE

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	14 PRESSURE psi OR kPa AFTER	15 VOLUME READING BEFORE	15 VOLUME READING AFTER	15 VOLUME NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
	1145			30		.0385		
	1200		8	30	.0385	.0325	-.0060	
	1215		4	30	.0325	.0280	-.0045	
	1230	FIXED leak IN LINE	6	30	.0280	.0255	-.0025	
	1245		20	30	.0255	.0230	-.0025	-.0065/hr.
	1300		25	30	.0230	.0220	-.0010	"Tight"
	1315		26	30	.0220	.0215	-.0005	
	1317	Bleedback check	30	0	.0215	.0250	+.0035	OK

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

By: Signature B. Conley

12/11/05 Technicians Certification No.

T. Bash Technicians

OHM
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS: FINDLAY, OHIO
800-537-9540 (24 Hours)

OHM
O.H. MATERIALS CORP.
800-537-9540 (24 HR)

5626
OHM PROJECT NO.

ML-07
SERIAL NO. OF TEST UNIT

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

VENT LINE

OWNER: Name

LOCATION: State Mich; City Flint

DATE OF TEST: Year 88; Mo 1; Day

1 LOCATION: 1300 N. Dort Highway (Street No. and/or Corner) Flint (City) Michigan (State) Telephone No.

2 OWNER: AC Spark Plug (Name) Same (Address) Representative Position Telephone No.

3 OPERATOR: ______ Name Dealer, Mgr. or Other Address (If different than Location) Telephone No.

4 REASON FOR TEST ______

5 TEST REQUESTED BY: ______ Name Position Order No. Billing Address

6 SPECIAL INSTRUCTIONS: ______

7 COVER OVER LINES Sand (CONCRETE, ASPHALT, ETC.) APPROXIMATE BURIAL DEPTH 3'-4'

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☑ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS Remote

10 WEATHER Cold Clear 25°F TEMPERATURE IN TANKS ______ °F ______ °C

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	14 PRESSURE psi OR kPa AFTER	15 VOLUME READING BEFORE	15 VOLUME READING AFTER	NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
Vent Line for tank #5009								
	1545	Begin test	[illegible]	30		.059		
	1600		3	30	.0590	.0470	.0120	
	1615		4	30	.0470	.0410	.0060	-.0260
	1630		4	30	.0410	.0365	.0045	Not Certifiable
	1645			30	.0365	.0330	.0035	Bleed BACK
								.0330 -.0270

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329

By: Signature
122110184

Tim Bast
Brian Conkey

OHM
O.H. MATERIALS CORP.

OHM

O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

5626
OHM PROJECT NO.

MLT07
SERIAL NO. OF TEST UNIT

1 LOCATION: AC GM Sparkplug (Street No. and/or Corner) Flint (City) Mich (State) ______ (Telephone No.)

2 OWNER: ______ (Name) ______ (Address) ______ (Representative) ______ (Position) ______ (Telephone No.)

3 OPERATOR: ______ (Name) ______ (Dealer, Mgr. or Other) ______ (Address (if different than Location)) ______ (Telephone No.)

4 REASON FOR TEST: Gas Test Cell Room #3 2" dump Line to tank #9

5 TEST REQUESTED BY: Tested with Gas (Name) ______ (Position) ______ (Order No.) ______ (Billing Address)

6 SPECIAL INSTRUCTIONS: 2" Dump line of 3 lines this is the Middle Line

7 COVER OVER LINES: Concrete (CONCRETE, ASPHALT, ETC) APPROXIMATE BURIAL DEPTH 10"

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☒ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS: N/A line in floor of Bld

10 WEATHER ______ TEMPERATURE IN TANKS ______ °F ______ °C

OWNER: Name ______

LOCATION: State Mich City Flint

DATE OF TEST: Year 88 Mo. 1 Day ______

MIDDLE LINE

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	14 PRESSURE psi OR kPa AFTER	15 VOLUME READING BEFORE	15 VOLUME READING AFTER	15 VOLUME NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
	1000			30		.0870		
	1015		0	30	.0870	.0825	-.0045	
	1030		5	30	.0825	.0820	-.0005	-.00755
	1045		14	30	.0820	.080	-.0020	Tight line
	1100		18	30	.0800	.0790	-.0010	Bleed Back
								.079 to .082
								+.003 ok

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329.

By: Signature

12/10/94

OHM
O.H. MATERIALS CORP.

5626
OHM PROJECT NO.

MLT-07
SERIAL NO. OF TEST UNIT

OHM
O-H MATERIALS CORP.
800-537-9540 (24 HR)

DATA CHART FOR LINE TEST

petro Tite
LINE TESTER

OWNER — Name:
LOCATION — State: Mich; City: Flint
DATE OF TEST — Year: 88; Mo: 1; Day:

1 LOCATION: AC GM Sparkplug (Street No. and/or Corner) Flint (City) Mich (State) (Telephone No.)

2 OWNER: (Name) (Address) (Representative) (Position) (Telephone No.)

3 OPERATOR: (Name) (Dealer, Mgr. or Other) (Address (if different than Location)) (Telephone No.)

4 REASON FOR TEST: South line of the 3 lines tested off of return line (dump line)

5 TEST REQUESTED BY: (Name) (Position) (Order No.) (Billing Address)

6 SPECIAL INSTRUCTIONS: Gas test Cell Room #2, 2" dump line to tank #9

7 COVER OVER LINES: Concrete Floor in bld. (CONCRETE, ASPHALT, ETC.) APPROXIMATE BURIAL DEPTH:

8 IS A TANK TEST TO BE MADE WITH THIS LINE TEST? ☐ YES ☒ NO

9 MAKE AND TYPE OF PUMP OR DISPENSERS: 2" dump line to tank # 9

10 WEATHER: ______ TEMPERATURE IN TANKS ____ °F ____ °C

SOUTH LINE

11 IDENTIFY EACH LINE AS TESTED	12 TIME (MILITARY)	13 LOG OF TEST PROCEDURES, AMBIENT TEMPERATURE, WEATHER, ETC.	14 PRESSURE psi OR kPa BEFORE	AFTER	15 VOLUME READING BEFORE	AFTER	NET CHANGE	16 TEST RESULTS CONCLUSIONS, REPAIRS & COMMENTS
	tank #9							
1015				30				
1030			20.0	30	.0098	.094	-.0040	
1045			18.0	30	.094	.092	.0020	→ 0.0090
1100			20.0	30	.0920	.0905	.0015	Tight line
1115			20.0	30	.0905	.0890	.0015	Bleed back
								.0890 - .1300
								.041

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as ("Tight") - ("Not Tight") meet the criteria established by the National Fire Protection Association Pamphlet 329

By: Signature: [signature]
Technicians Certification No. 7211018Y
Technicians: Brian Conley

OHM
O.H. MATERIALS CORP.
CORPORATE HEADQUARTERS: FINDLAY, OHIO

APPENDIX D

FINANCIAL ASSURANCE SUBMISSION

Mr. David F. Hales, Director
Michigan Department of Natural Resources
Waste Management Division
505 W. Main
Northville, MI 48167

Dear Mr. Hales:

I am the chief financial officer of General Motors Corporation, 3044 West Grand Boulevard, Detroit, Michigan 48202. This letter is in support of the firm's use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Part 7 of the Act 64 Administrative Rules.

1. This firm is the owner or operator of the following facilities for which liability coverage is being demonstrated through the financial test specified in Subpart H of 40 CFR Part 264. See Attachments A, B and MI.

2. This firm owns or operates the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in Part 7 of the Act 64 Administrative Rules. The current closure and/or post-closure cost estimates covered by the test are shown for each facility: See Attachment MI.

3. This firm guarantees, through the corporate guarantee specified in Part 7 of the Act 64 Administrative Rules, closure and post-closure care of the following facilities owned or operated by its subsidiaries. The current cost estimates for closure or post-closure care so guaranteed are shown for each facility: None.

4. In other states where EPA is not administering the financial requirements of Subpart H of 40 CFR Part 264, this firm, as owner or operator or guarantor, is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Part 264. The current closure and/or post-closure estimates covered by such a test are shown for each facility: See Attachment B.

9275f-91

5. In states where EPA is administering the financial requirements of Subpart H of 40 CFR Part 264, this firm, as owner or operator or guarantor, is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of the financial test specified in Subpart H of 40 CFR Part 264. The closure and/or post-closure cost estimates covered by this test are shown for each facility: See Attachment A.

6. This firm is the owner or operator of the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to EPA or a state through the financial test or any other financial assurance mechanism specified in Subpart H of 40 CFR Part 264 or equivalent or substantially equivalent state mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: None.

This firm is required to file a Form 10-K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest fiscal year, ended December 31, 1987.

ALTERNATIVE I
($ In Millions)

1.	Sum of current closure and post-closure cost estimates (total of all cost estimates listed above)	$ 59.1
2.	Amount of annual aggregate liability coverage to be demonstrated	$ 8.0
3.	Sum of lines 1 and 2	$ 67.1
*4.	Total liabilities (if any portion of your closure or post-closure cost estimates is included in your total liabilities, you may deduct that portion from this line and add that amount to lines 5 and 6)	$ 54,196.8
*5.	Tangible net worth	$ 28,038.7
*6.	Net worth	$ 33,225.1
*7.	Current assets	$ 39,771.5
*8.	Current liabilities	$ 25,528.2
9.	Net working capital (line 7 minus line 8)	$ 14,243.3
*10.	The sum of net income plus depreciation, depletion, and amortization	$ 9,662.9
*11.	Total assets in U.S. (required only if less than 90% of assets are located in the U.S.)	$ 68,168.1
*12.	Total assets in Michigan excluding the value of land used for hazardous waste disposal	$ 8,621.5

		YES	NO
13.	Is line 5 at least $10 million?	X	
14.	Is line 5 at least 6 times line 3?	X	
15.	Is line 9 at least 6 times line 3?	X	
*16.	Are at least 90% of assets located in the U.S.? If not complete line 17.		X
17.	Is line 11 at least 6 times line 3?	X	
18.	Is line 4 divided by line 6 less than 2.0?	X	
19.	Is line 10 divided by line 4 greater than 0.1?	X	
20.	Is line 7 divided by line 8 greater than 1.5?	X	
*21.	Is line 12 at least $50 million?	X	
22.	Is line 12 at least 6 times line 1?	X	

I hereby certify that the wording of this letter is identical to the wording in model letter specified by the Director for the financial test related to closure/post-closure care as well as liability insurance coverage, as such letter was specified on the date shown immediately below.

R. T. O'Connell
Executive Vice President
October 28, 1988

ATTACHMENT MI

EPA ID: MID980568745
Facility Name: GMC AC SPARK PLUG: FLINT AVERILL AVE.
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 4134 DAVISON ROAD, County: GENESEE
Current closure cost estimate: $568,300

EPA ID: MID005356647
Facility Name: GMC AC SPARK PLUG: FLINT DORT HWY.
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 1300 N. DORT HIGHWAY, County: GENESEE
Current closure cost estimate: $85,400

EPA ID: MID980568570
Facility Name: GMC AC SPARK PLUG: FLINT WASTEWATER TRTMT PL
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 3026 ROBERT T. LONGWAY BLVD., County: GENESEE
Current closure cost estimate: $19,900

EPA ID: MID980568620
Facility Name: GMC AC SPARK PLUG: FLINT ENGINEERING
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 3026 ROBERT T. LONGWAY BLVD., County: GENESSE
Current closure cost estimate: $8,500

U.S. EPA REGION V

MICHIGAN

EPA ID: MID005356704
Facility Name: GMC BOC: DETROIT CLARK AVE.
Mailing Address: 2860 CLARK AVE.
DETROIT, MI 48210
Facility Location: 2860 CLARK AVENUE, County: WAYNE
Current closure cost estimate: $95,000

EPA ID: MID005356712
Facility Name: GMC BOC: FLINT OPERATIONS
Mailing Address: 902 E. HAMILTON
FLINT, MI 48550
Facility Location: 902 EAST HAMILTON BLDG. 85, County: GENESEE
Current closure cost estimate: $565,500

EPA ID: MID000718544
Facility Name: GMC BOC: LAKE ORION
Mailing Address: P.O. BOX 347
LAKE ORION, MI 48053
Facility Location: 4555 GIDDINGS ROAD, County: OAKLAND
Current closure cost estimate: $122,000

EPA ID: MID005356894
Facility Name: GMC BOC: LANSING PLANT 1
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 920 TOWNSEND STREET, County: INGHAM
Current closure cost estimate: $40,000

U.S. EPA REGION V

MICHIGAN

EPA ID: MID980700827
Facility Name: GMC BOC: LANSING PLANT 2 & 3
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 2800 & 2801 W. SAGINAW STREET, County: INGHAM
Current closure cost estimate: $65,800

EPA ID: MID980700843
Facility Name: GMC BOC: LANSING PLANT 5
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 2901 SOUTH CANAL ROAD, County: EATON
Current closure cost estimate: $67,600

EPA ID: MID041793340
Facility Name: GMC CENTRAL FOUNDRY: SAGINAW GREY & NODULAR
Mailing Address: 2100 VETERANS MEMORIAL PARKWAY
SAGINAW, MI 48601
Facility Location: 2100 VETERANS MEMORIAL PARKWAY, County: SAGINAW
Current closure cost estimate: $36,100

EPA ID: MID005356696
Facility Name: GMC CENTRAL FOUNDRY: SAGINAW MALLEABLE IRON
Mailing Address: 77 W. CENTER ST.
SAGINAW, MI 48605
Facility Location: 77 W. CENTER STREET, County: SAGINAW
Current closure cost estimate: $54,200

U.S. EPA REGION V

MICHIGAN

EPA ID: MID005356688
Facility Name: GMC CPC: BAY CITY
Mailing Address: 100 FITZGERALD ST.
BAY CITY, MI 48708
Facility Location: 100 FITZGERALD STREET, County: BAY
Current closure cost estimate: $65,000

EPA ID: MID005356886
Facility Name: GMC CPC: PONTIAC
Mailing Address: ONE PONTIAC PLAZA
PONTIAC, MI 48053
Facility Location: ONE PONTIAC PLAZA, County: OAKLAND
Current closure cost estimate: $75,000

EPA ID: MID005356910
Facility Name: GMC CPC: PONTIAC FIERO ASSEMBLY
Mailing Address: 900 BALDWIN AVE.
PONTIAC, MI 48058
Facility Location: 900 BALDWIN AVENUE, County: OAKLAND
Current closure cost estimate: $73,000

EPA ID: MID000809905
Facility Name: GMC CPC: ROMULUS
Mailing Address: 36880 ECORSE RD.
ROMULUS, MI 48174
Facility Location: 36880 ECORSE ROAD, County: WAYNE
Current closure cost estimate: $49,100

MICHIGAN

EPA ID: MID005356845
Facility Name: GMC DELCO MORAINE: SAGINAW MANUFACTURING
Mailing Address: 2328 E. GENESEE AVE.
SAGINAW, MI 48601
Facility Location: 2328 EAST GENESEE AVENUE, County: SAGINAW
Current closure cost estimate: $31,000

EPA ID: MID005356621
Facility Name: GMC DELCO PRODUCTS: LIVONIA
Mailing Address: 13000 ECKLES RD.
LIVONIA, MI 48151
Facility Location: 13000 ECKLES ROAD, County: WAYNE
Current closure cost estimate: $287,000

EPA ID: MID005356860
Facility Name: GMC FISHER GUIDE: FLINT COLDWATER RD.
Mailing Address: 1245 E. COLDWATER RD
FLINT, MI 48559
Facility Location: 1245 EAST COLDWATER ROAD, County: GENESEE
Current closure cost estimate: $2,802,000
Current post-closure cost estimate: $767,900

EPA ID: MID005356654
Facility Name: GMC FISHER GUIDE: FLINT MANUFACTURING
Mailing Address: 300 N. CHEVROLET AVE.
FLINT, MI 48555
Facility Location: 300 NORTH CHEVROLET AVENUE, County: GENESEE
Current closure cost estimate: $182,600

U.S. EPA REGION V

MICHIGAN

EPA ID: MID082220757
Facility Name: GMC GM PROVING GROUND: MILFORD
Mailing Address: HICKORY RIDGE & GM ROAD
MILFORD, MI 48042
Facility Location: HICKORY RIDGE & GM ROAD, County: OAKLAND
Current closure cost estimate: $10,100

EPA ID: MID050615996
Facility Name: GMC GM TECHNICAL CENTER: WARREN
Mailing Address: 30800 MOUND RD. SERVICE SECT.
WARREN, MI 48090
Facility Location: 30800 MOUND ROAD, County: MACOMB
Current closure cost estimate: $164,900

EPA ID: MID000718551
Facility Name: GMC HYDRA-MATIC: THREE RIVERS
Mailing Address: ONE HYDRA-MATIC DRIVE
THREE RIVERS, MI 49093
Facility Location: ONE HYDRA-MATIC DRIVE, County: ST. JOSEPH
Current closure cost estimate: $18,200

EPA ID: MID980587893
Facility Name: GMC HYDRA-MATIC: YPSILANTI
Mailing Address: WILLOW RUN
YPSILANTI, MI 48198
Facility Location: WILLOW RUN, County: WASHTENAW
Current closure cost estimate: $31,800

U.S. EPA REGION V

MICHIGAN

EPA ID: MID084571256
Facility Name: GMC INLAND: ADRIAN MANUFACTURING
Mailing Address: 1450 E. BEECHER STREET
ADRIAN, MI 49221
Facility Location: 1450 E. BEECHER STREET, County: LENAWEE
Current closure cost estimate: $24,700

EPA ID: MID020105565
Facility Name: GMC NEW DEPARTURE HYATT: DETROIT FORGE
Mailing Address: 8435 ST. AUBIN
DETROIT, MI 48212
Facility Location: 8435 ST. AUBIN, County: WAYNE
Current closure cost estimate: $26,700

EPA ID: MID000721738
Facility Name: GMC ROCHESTER PRODUCTS: COOPERSVILLE
Mailing Address: 2100 BURLINGAME
COOPERSVILLE, MI 49404
Facility Location: 999 RANDALL STREET, County: OTTAWA
Current closure cost estimate: $2,100

EPA ID: MID017079625
Facility Name: GMC ROCHESTER PRODUCTS: GRAND RAPIDS
Mailing Address: 2100 BURLINGAME
GRAND RAPIDS, MI 49501
Facility Location: 2100 BURLINGAME, County: KENT
Current closure cost estimate: $52,100

EPA ID: MID086744802
Facility Name: GMC SAGINAW: DETROIT
Mailing Address: 1840 HOLBROOK AVENUE
DETROIT, MI 48212
Facility Location: 1840 HOLBROOK AVENUE, County: WAYNE
Current closure cost estimate: $124,100

U.S. EPA REGION V

MICHIGAN

EPA ID: MID003912920
Facility Name: GMC SERVICE PARTS OPER.: DRAYTON PLAINS
Mailing Address: 6060 W. BRISTOL RD.
DRAYTON PLAINS, MI 48020
Facility Location: 5260 WILLIAMS LAKE ROAD, County: OAKLAND
Current closure cost estimate: $66,400

EPA ID: MID003906773
Facility Name: GMC SERVICE PARTS OPER.: FLINT
Mailing Address: 6060 W. BRISTOL RD.
FLINT, MI 48554
Facility Location: 6060 WEST BRISTOL ROAD, County: GENESEE
Current closure cost estimate: $19,900

EPA ID: MID076380583
Facility Name: GMC TRUCK & BUS: DETROIT ASSEMBLY
Mailing Address: 601 PIQUETTE
DETROIT, MI 48202
Facility Location: 601 PIQUETTE, County: WAYNE
Current closure cost estimate: $40,000

EPA ID: MID005356902
Facility Name: GMC TRUCK & BUS: PONTIAC EAST & CENTRAL
Mailing Address: 660 SOUTH BOULEVARD EAST
PONTIAC, MI 48053
Facility Location: 660 SOUTH BOULEVARD EAST, County: OAKLAND
Current closure cost estimate: $207,800

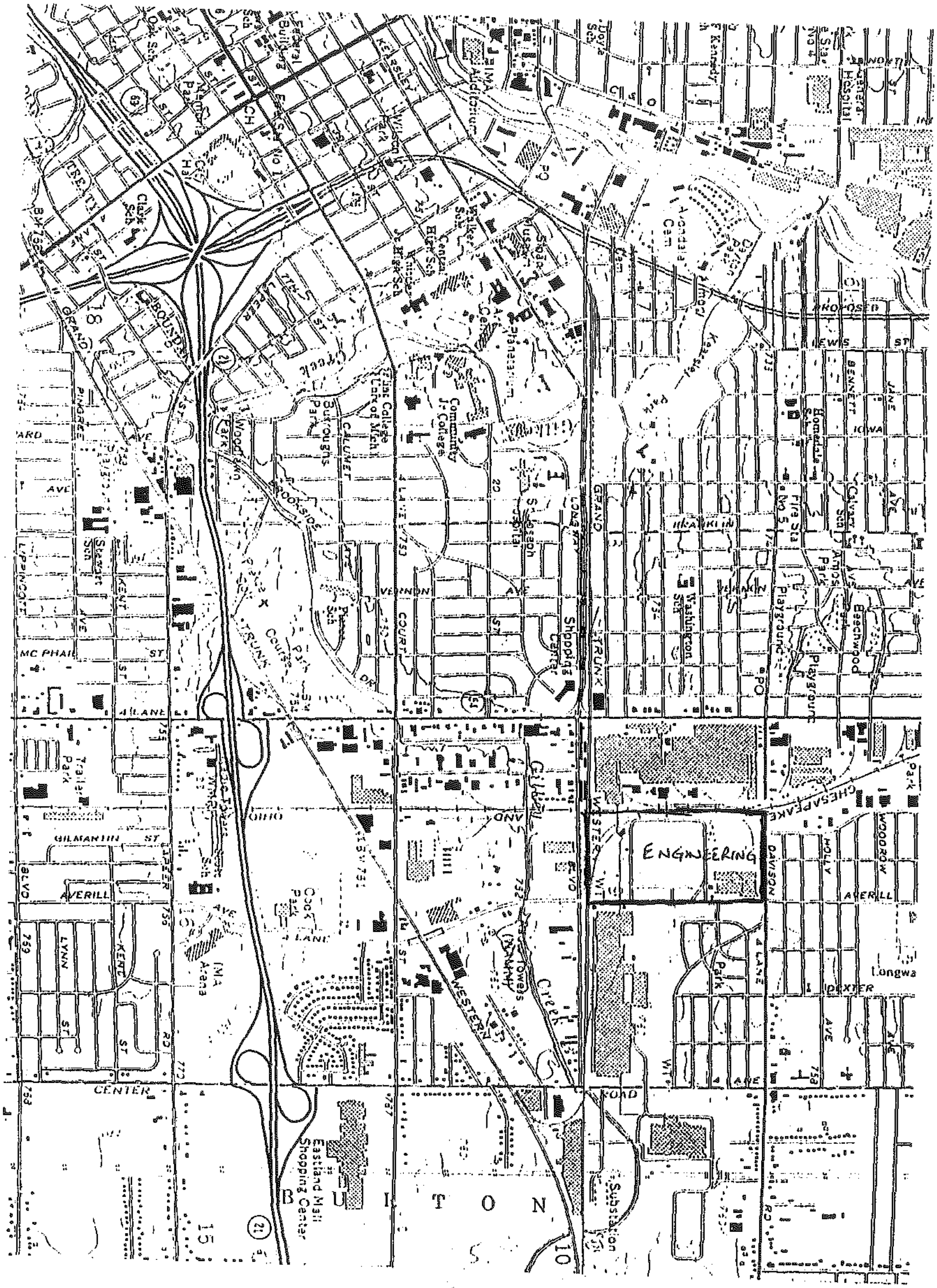
EPA ID: MID980568836
Facility Name: GMC TRUCK & BUS: PONTIAC WEST
Mailing Address: 660 SOUTH BOULEVARD EAST
PONTIAC, MI 48053
Facility Location: 275 FRANKLIN ROAD, County: OAKLAND
Current closure cost estimate: $51,300

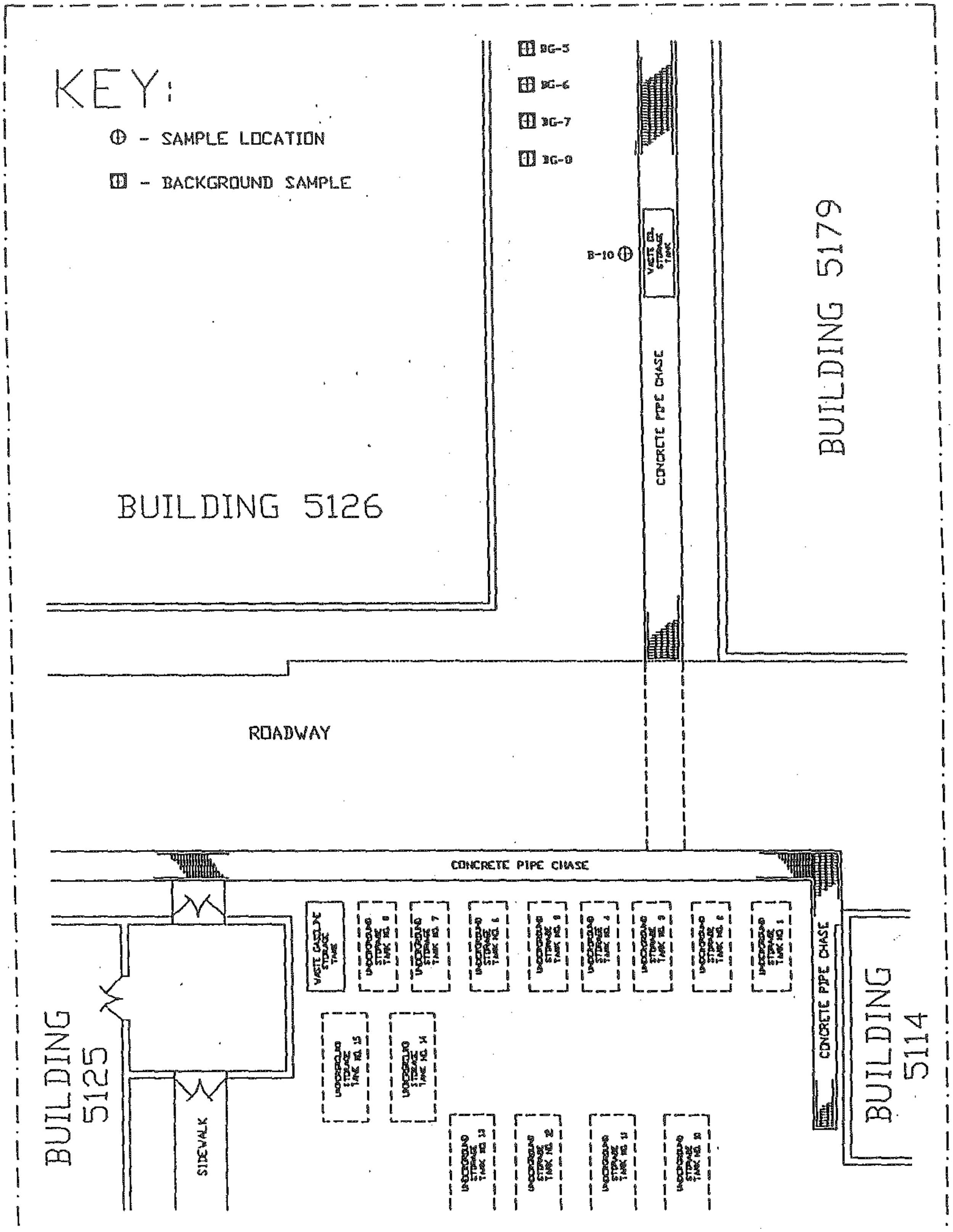
EPA ID: MID005356951
Facility Name: GMC TRUCK & BUS: VAN SLYKE COMPLEX
Mailing Address: G 3248 VAN SLYKE RD.
FLINT, MI 48552
Facility Location: G 3248 VAN SLYKE ROAD, County: GENESEE
Current closure cost estimate: $189,600

APPENDIX E

LOCATION AND SITE PLANS

LOCATION & SITE PLAN





TECHNA CORPORATION

JOB NO. 207-8001

DATE: OCT. 14, 1988 | REV. Ø

WASTE OIL STORAGE TANK SAMPLING POINTS

SCALE: 1" = 20'-0"

AC ROCHESTER DIVISION
GENERAL MOTORS CORP
ENGINEERING COMPLEX
MID980568620
1601 N. AVERILL AVE. FLINT MI 48556

N

FIGURE 6

A.4.5

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

DAVID F. HALES, Director

Region III Headquarters
P.O. Box 30028, Lansing, MI 48909

September 14, 1990

Mr. Richard Hubler, General Supervisor
GMC AC Rochester
1300 North Dort Highway
Flint, MI 48556

RE: Financial Assurance for AC Rochester Facilities in Flint
MID 980 568 620

Dear Mr. Hubler:

A financial assurance review has been performed on the mechanisms established for compliance with the closure costs and insurance requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) of 1976, as amended and Michigan's Hazardous Waste Management Act, Act 64 of 1979, as amended.

As a result of that review, it has been determined that these facilities have no deficiencies in the areas reviewed.

If you have any questions, feel free to contact me.

Sincerely,

Leroy Vahovick

Leroy Vahovick
Environmental Quality Analyst
WASTE MANAGEMENT DIVISION
Lansing District Office
517-322-5104

LV:aw

R 1026-1
9/89

RECYCLED PAPER

RCRA/ACT 64 INSPECTION REPORT

I.D. Number (U.S. EPA or Michigan) MID 980568620

FACILITY NAME GMC AC Spark plug Div-Davison Eng

Mailing Address 1601 N Averill Ave

Flint Michigan 48556

City Zip Code

DATE 9/14/90 TIME (from) ______ (to) ______

PERSON(S) INTERVIEWED	TITLE	TELEPHONE #
Dick Kubler	Gen Supervisor	312 257 6257

INSPECTOR(S)	AGENCY	TELEPHONE #
Leroy Vahovick	Mich DNR	517-322-6313

Primary Business of this Facility: Automotive parts mfg

Reason for Inspection:

_____ Routine _____ Follow-up _____ Complaint

(rev. 05/23/90) PR5122

MID 980 ··8 620 Engineering

FINANCIAL CAPABILITY

Part 7 R299.9701 to R299.9710

Note: Facilities not yet issued an operating license in accordance with Part 5 of these rules shall comply with Financial capability, Part 7, of these rules, by August 14, 1989. Rule 701.(2) Federal and State facilities are exempt from financial capability requirements.

Cost estimate for Closure and Post Closure Care Rule 702(1):

40 CFR 264.142 and 264.144

	Violation Class	Yes	No	N/A
1. Is the written closure cost estimate available and on site? 264.142(d) Note: Indicate the amount: 74,700	___	___	___	___
2. Is the written post closure cost estimate available and on site 264.144(d) (Required only for disposal surface impoundment, land treatment, landfill unit or waste pile. Note: Indicate the amount:	___	___	___	___
3. a) Have any revisions been made to the closure/post closure plan which increase the cost of closure/post closure? 264.142(c) and 264.144(c).	___	___	___	___
b) If yes, were the cost estimate(s) revised to reflect this increase within 30 days of approval to modify closure/post closure plan?	___	___	___	___

9-28-89

	Violation Class	Yes	No	N/A
4. Have the closure/post closure cost estimates been adjusted for inflation by either recalculating cost estimates or using an inflation factor derived from the most recent implicit price deflation? 264.142(b) and 264.144(b)	___	___	___	___
a) Have closure/post closure cost estimates been revised within 30 days after firm's fiscal year (for facilities using financial test or corporate guarantee)?	___	___	___	___
b) For all other financial instruments, have closure/post closure cost estimates been revised within 60 days prior to anniversary date of establishment?	___	___	✓	___
5. Have closure/post closure cost estimates for facilities using financial test or corporate guarantee been revised within 30 days after close of firms fiscal year? 264.142(b) and 264.144(b)	___	___	✓ See above.	___
6. For all other financial instruments have closure/post closure cost estimates for facilities been revised within 60 days of their anniversary date of establishment? 264.142(b) and 264.144(b)	___	___	___	✓
7. Have the closure/post closure cost estimates been adjusted by *either* recalculating cost estimates or using the most recent appropriate inflation factor? 264.142(b) 264.144(b)	___	___	___	___

Approval for 30 day extension granted per 4/2/90 ltr to D.R. Hales
Use financial test

Comments: ____

____

____

Financial Assurance for Closure/Post Closure Care Rule 703

8. Indicate which of the following financial mechanism(s) are used to establish financial assurance for closure/post closure care Rule 703(1). Also, indicate if its for closure/post closure care Rule 7083 (1).

______	Trust fund Rule 704
______	Surety bond guaranteeing performance of closure/post closure care. Rule 705
______	Letter of Credit, Rule 706.
______	Certificate of Deposit or Time Deposit account. Rule 707
______	Closure post/closure insurance Rule 708
✓	Financial test and corporate guarantee for closure/post closure Rule 709.

	Violation Class	Yes	No	N/A
9. If multiple mechanisms are used are they limited to trusts, surety bonds, letters of credit certificates of deposits and insurance? Rule 703(2)				✓
10. Are financial assurance mechanisms used for more than one facility? Rule 703(3). If so, indicate their names and ID number.	✓			

Comments: See attachments to financial test (MI-A-B)

FINANCIAL MECHANISMS

	Violation Class	Yes	No	N/A
11. Trust fund. Rule 704 A. Is trust agreement on DNR approved form? Rule 704(1)				✓

	Violation Class	Yes	No	N/A
B. Is trust funded at 100% closure/post closure cost. Rule 704(2).				
If no, indicate amount.				
12. Surety Bond Guarantee. Rule 705				
A. Is bond executed on DNR approved form? Rule 705(1)				✓
12. B. Is sum of bond equal or greater than closure/post closure costs? Rule 705 (4). If no, indicate amount.				
13. Letter of Credit Rule 706				
A. Is letter of credit executed on a form approved by Director. Rule 706(1)				✓
B. Is letter of credit accompanied by a letter from owner/operator providing the following: EPA ID number; name and address of facility; amount of funds assured for closure/post closure? Rule 706(3)		✓		
C. Is letter of credit equal to or greater than closure/post closure costs? Rule 706(5) If no, indicate amount.		✓		
14. Certificate of deposit/time deposit. Rule 707				
A. Is certificate or account in only name of the director? Rule 707(2)				✓

	Violation Class	Yes	No	N/A
B. Is there an agreement which identifies reasons which director may cash the certificate or account on a DNR approved form? Rule 707(3)	___	___	___	___
C. Is certificate for amount equal to closure/post closure cost estimates. Rule 707(4).	___	___	___	___
If no, indicate amount.				
15. Closure/post closure insurance. Rule 708.				
A. Does certificate use wording approved by director; or	___	___	___	✓
B. A certified true and complete copy of the policy. Rule 708(1)	___	___	___	___
C. Is the closure/post closure insurance policy issued for face amount at least equal to current closure/post closure cost estimate? Rule 708(4).	___	___	___	___
If no, indicate amount.				
16. If using multiple assurance mechanisms, do they equal or exceed closure/post closure cost estimates? Rule 703(2).	___	___	___	✓
Indicate total.				

Comments: ______________________________

	Violation Class	Yes	No	N/A
17. Financial test and corporate guarantee, Rule 709. For financial test does the owner operator meet A or B? Rule 709(1)				
A. All of the following:				
1. Two of the following three ratios:				
a. Ratio of liabilities to net worth less than 2.		✓		
b. A ratio of sum of net income plus depreciation depletion and amortization to total liabilities of more than 0.1.		✓		
c. A ratio of current assets to liabilities of more than 1.5. and:		✓		
2. Net working capital and tangible net worth each not less than 6 times the sum of closure and post/closure cost estimates.		✓		
3. Tangible net worth not less than $10,000,000 and:		✓		
4. Assets in the U.S. not less than 90% of total assets or not less than ~~6 times the closure/post closure costs~~ and:				
5. Total assets in Michigan not less than $50,000,000 or not less than 6 times sum of approved closure/ post closure cost estimates (larger of the two).		✓		

Comments: ______________________________

____

____

or all of the following:

	Violation Class	Yes	No	N/A
B. 1. An acceptable Standard and Poors or Moody's Rating for the most recent bond issuance.	[illegible]			
2. Tangible net worth not less than 6 times the sum of closure/post closure cost estimates.		✓		
3. Tangible net worth not less than $10,000,000		✓		
4. Assets in the U.S. not less than 90% of total assets ~~or not less~~ than 6 times closure/post closure costs.		✓		
5. Total assets in Michigan at least $50,000,000 or not less than 6 times sum of approved closure/post closure cost estimates (or larger of the two)		✓		

Comments: ____

____

____

	Violation Class	Yes	No	N/A
18. For financial test and corporate guarantee has the owner operator: Rule 709(3)				
A. Have a letter signed by chief financial officer and worded as specified by director.	✓			
B. A copy of independent CPA report examining owner operators financial statement.	✓			
C. A copy of special report by independent CPA stating:				

	Violation Class	Yes	No	N/A
1. The Independent CPA compared data from chief financial officer which specifies having derived from the independent audit-year-end financial statement; and		✓		
2. No matters came to their attention indicating the information needs adjustments.		✓		
19. Corporate guarantee. Rule 709.10 Does owner meet requirements of 17 and 18 above; and:				
A. Use wording identical to wording provided by Director.				✓
B. Does terms of corporate guarantee include:				
1. Appropriate provisions of owner/operator facts to perform final closure				
2. Appropriate cancellation provisions.				
3. Alternate financial assurance provisions.				

Comments: ______________________________

____

____

Liability Requirements Rule 710
(Note: When reviewing insurance, do not include amount of deductible coverage)

	Violation Class	Yes	No	N/A
19. Does owner/operator maintain liability coverage for sudden and accidental occurrences not less than \$1,000,000 per occurrence with an annual aggregate not less than \$2,000,000? Rule 710(1)	✓			

	Violation Class	Yes	No	N/A
20. For surface impoundment landfill or land treatment does owner/operator maintain liability coverage for sudden accidental occurrences not less than $3,000,000 per occurrence with an annual aggregate of not less than $6,000,000? Rule 701(2)	___	___	___	___
21. For the required insurance policy(s) is each policy amended by attachment of an endorsement on a form provided by the Director? and	___	___	___	✓
22. Is insurer licensed to transact business in Michigan?	___	___	___	✓

Comments: ______________________________

Deloitte & Touche

Suite 3100
100 Renaissance Center
Detroit, Michigan 48243-1167
Telephone: (313) 446-0100
ITT TIMETRAN: 4994951

RECEIVED
APR 12 1990
WASTE MANAGEMENT DIV.

General Motors Corporation:

We have audited, in accordance with generally accepted auditing standards, the Consolidated Balance Sheet of General Motors Corporation (the "Corporation") and consolidated subsidiaries as of December 31, 1989 and the related Statements of Consolidated Income and Consolidated Cash Flows for the year then ended, and have issued our report thereon dated February 14, 1990. We have not performed any auditing procedures beyond the date of our report on the 1989 financial statements; accordingly, this report is based on our knowledge as of that date and should be read with that understanding.

At your request, we have performed the procedures enumerated below with respect to the accompanying letter from Mr. R. T. O'Connell to the Director, Michigan Department of Natural Resources, Waste Management Division, dated April 9, 1990. It is understood that this report is solely for filing with the addressee of the accompanying letter, and is not to be used for any other purpose. The procedures that we performed are summarized as follows:

1. We compared the amount included in item 10 under the caption Alternative II in the letter referred to above with the corresponding amount in the financial statements referred to in the first paragraph.

2. We recomputed from, or reconciled to, the financial statements referred to in the first paragraph the information included in items 9 and 15 under the caption Alternative II in the letter referred to above.

Because the procedures referred to in the preceding paragraph were not sufficient to constitute an audit made in accordance with generally accepted auditing standards, we do not express an opinion on any of the information or amounts listed under the caption Alternative II in the aforementioned letter. In performing the procedures referred to above, however, no matters came to our attention that caused us to believe that the information or amounts included in items 9, 10, and 15 should be adjusted.

Deloitte & Touche

April 9, 1990

Financial

General Motors Corporation

April 2, 1990

RECEIVED
APR 03 1990
WASTE MANAGEMENT DIV.

Mr. David F. Hales, Director
Michigan Department of Natural Resources
Waste Management Division
505 W. Main
Northville, MI 48167

Attention: L. King

Dear Mr. Hales:

This letter is to confirm that General Motors Corporation has been granted a 30-day extension, to April 30, 1990, to submit its letter in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Part 7 of the Act 64 Administrative Rules.

Should you have any questions in this regard, please contact Frank Seibert of this office on (313) 556-4203.

C. L. Goad

C. L. Goad, Director
Government Business and
Reporting Section

cc: E. H. Flegm
A. J. DiMarco

1041m-15

General Motors Corporation

RECEIVED
APR 12 1990
WASTE MANAGEMENT DIV.

Mr. David F. Hales, Director
Michigan Department of Natural Resources
Waste Management Division
505 W. Main
Northville, MI 48167

Dear Mr. Hales:

I am the chief financial officer of General Motors Corporation, 3044 West Grand Boulevard, Detroit, Michigan 48202. This letter is in support of the firm's use of the financial test to demonstrate financial capability as specified in Part 7 of the Act 64 Administrative Rules.

1. This firm is the owner or operator of the following facilities for which financial responsibility for liability coverage is being demonstrated through the financial test specified in Part 7 of the Act 64 Administrative Rules: See Attachment MI.

2. This firm guarantees, through the corporate guarantee specified in Part 7 of the Act 64 Administrative Rules, liability coverage for the following facilities owned or operated by its subsidiaries: None.

3. This firm owns or operates the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in Part 7 of the Act 64 Administrative Rules. The current closure and/or post-closure cost estimates covered by the test are itemized separately for each facility: See Attachment MI.

4. This firm guarantees, through the corporate guarantee specified in Part 7 of the Act 64 Administrative Rules, closure and post-closure care of the following facilities owned or operated by its subsidiaries. The current cost estimates for closure or post-closure care so guaranteed are itemized separately for each facility: None.

5. In other states where EPA is not administering the financial requirements of Subpart H of 40 CFR Part 264, this firm, as owner or operator or guarantor, is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Part 264. The current closure and/or post-closure estimates covered by such a test are itemized separately for each facility: See Attachment B.

6. In other states where EPA is not administering the financial requirements of Subpart H of 40 CFR Part 264, this firm, as owner or operator or guarantor, is demonstrating financial responsibility for liability coverage for the following facilities through the use of test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Part 264. The liability coverages covered by such a test are itemized separately for each facility: See Attachment B.

 General Motors Building 3044 West Grand Boulevard Detroit, Michigan 48202

7. In states where EPA is administering the financial requirements of Subpart H of 40 CFR Part 264, this firm, as owner or operator or guarantor, is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of the financial test specified in Subpart H of 40 CFR Part 264. The closure and/or post-closure cost estimates covered by this test are itemized separately for each facility: See Attachment A.

8. In states where EPA is administering the financial requirements of Subpart H of 40 CFR Part 264, this firm, as owner or operator or guarantor, is demonstrating financial responsibility for liability coverage for the following facilities through the use of the financial test specified in Subpart H of 40 CFR Part 264. The liability coverages covered by this test are shown for each facility: See Attachment A.

9. This firm is the owner or operator of the following hazardous waste management facilities for which financial capability is not demonstrated either to EPA or a state through the financial test or any other financial assurance mechanism specified in Subpart H of 40 CFR Part 264 or equivalent or substantially equivalent state mechanisms. Both the liability coverages and current closure and/or post-closure cost estimate amounts not covered by such financial assurance are itemized separately for each facility: None.

10. This firm is the owner or operator of the following UIC facilities for which financial assurance for plugging and abandonment is required under 40 CFR Part 144. The current plugging and abandonment cost estimates as required by 40 CFR 144.62 are itemized separately for each facility: None.

This firm is required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31. The figures for the following items marked with an asterisk (*) are derived from this firm's independently audited, year-end financial statements for the latest fiscal year, ended December 31, 1989.

Alternative II

		$ Millions
1. Sum of current closure and post-closure cost estimates for Michigan facilities (total of all cost estimates listed in above paragraphs 3 and 4)...................	$	10.4
2. Sum of current closure and post-closure cost estimates for non-Michigan facilities (total of all cost estimates listed in above paragraphs 5, 7, and 9)	$	83.1

Alternative II (continued)

		$ Millions
3.	Sum of current plugging and abandonment cost estimates for all UIC facilities for which financial assurance is required under 40 CFR Part 144 (total of paragraph 10).	$ 0
4.	Amount of annual aggregate liability coverage (maximum aggregate for facilities listed in above paragraphs 1, 2, 6, 8, and 9)...Michigan $8.0 plus New York $29.0....	$ 37.0
5.	Sum of lines 1, 2, 3, and 4...........................	$ 130.5
6.	Current bond rating of most recent issuance and name of rating service.......Standard & Poors......	AA-
7.	Date of issuance of bond..............................	March 27, 1990
8.	Date of maturity of bond..............................	March 15, 1993
*9.	Tangible net worth (if any portion of the closure or post-closure cost estimates is included in "total liabilities" on your financial statements you may add that portion to this line)...........................	$ 27,856.2
*10.	Total assets in the U.S..............................	$ 131,595.8
11.	Total assets in Michigan excluding the value of land used for hazardous waste disposal.............	$ 9,600.7
12.	Total assets in Michigan including the value of land used for hazardous waste disposal.....................	$ 9,600.7

		YES	NO
13.	Is line 9 at least $10 million?.................	X	
14.	Is line 9 at least 6 times line 5?...............	X	
*15.	Are at least 90% of firm's assets located in the U.S.? If not, complete line 16.............		X
16.	Is line 10 at least 6 times line 5?.............	X	
17.	Is line 11 at least $50 million?................	X	
18.	Is line 12 at least 6 times line 1?.............	X	

I hereby certify that the wording of this letter is identical to the wording in the letter specified by the Director for the financial test as such letter was specified on the date shown immediately below.

R. J. O'Connell

R. J. O'Connell
Executive Vice President
April 9, 1990

9275f-77

ATTACHMENT MI*

* Liability coverages for Michigan facilities are for sudden accidental occurrences (i.e., $2.0 million) unless otherwise indicated.

MID980568620

General Motors Corporation

O: WMD
CC: RF

RECEIVED

APR 04 1990

U.S. EPA REGION 5
OFFICE OF REGIONAL ADMINISTRATOR

Mr. Valdas V. Adamkus
Regional Administrator
U.S. EPA Region V
230 S. Dearborn
Chicago, IL 60604

Dear Mr. Adamkus:

I am the chief financial officer of General Motors Corporation, 3044 West Grand Boulevard, Detroit, Michigan 48202. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Subpart H of 40 CFR Parts 264 and 265.

The firm identified above is the owner or operator of the following facilities for which liability coverage for both sudden and nonsudden accidental occurrences is being demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265: See Attachment A.

The firm identified above guarantees, through the guarantee specified in Subpart H of 40 CFR Parts 264 and 265, liability coverage for both sudden and nonsudden accidental occurrences at the following facilities owned or operated by the following subsidiaries of the firm: None.

1. The firm identified above owns or operates the following facilities for which financial assurance for closure or post-closure care or liability coverage is demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by the test are shown for each facility: See Attachment A.

2. The firm identified above guarantees, through the guarantee specified in Subpart H of 40 CFR Parts 264 and 265, the closure and post-closure care or liability coverage of the following facilities owned or operated by its subsidiaries. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility: None.

3. In States where EPA is not administering the financial requirements of Subpart H of 40 CFR Parts 264 and 265, this firm is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by such a test are shown for each facility: See Attachment B.

4. The firm identified above owns or operates the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanism specified in Subpart H of 40 CFR Parts 264 and 265 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: None.

5. This firm is the owner or operator of the following UIC facilities for which financial assurance for plugging and abandonment is required under 40 CFR Part 144. The current closure cost estimates as required by 40 CFR 144.62 are shown for each facility: None.

This firm is required to file a Form 10-K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this owner or operator ends on December 31. The figures, on the attached Alternative II, for the items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 1989.

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151(g) as such regulations were constituted on the date shown immediately below..

R. T. O'Connell
Executive Vice President
March 30, 1990

Deloitte & Touche

Suite 3100
100 Renaissance Center
Detroit, Michigan 48243-1167
Telephone: (313) 446-0100

ITT TIMETRAN: 4994951

General Motors Corporation:

We have audited, in accordance with generally accepted auditing standards, the Consolidated Balance Sheet of General Motors Corporation (the "Corporation") and consolidated subsidiaries as of December 31, 1989 and the related Statements of Consolidated Income and Consolidated Cash Flows for the year then ended, and have issued our report thereon dated February 14, 1990. We have not performed any auditing procedures beyond the date of our report on the 1989 financial statements; accordingly, this report is based on our knowledge as of that date and should be read with that understanding.

At your request, we have performed the procedures enumerated below with respect to the accompanying letter from Mr. R. T. O'Connell to the Regional Administrator, U.S. EPA Region V, dated March 30, 1990. It is understood that this report is solely for filing with the addressee of the accompanying letter, and is not to be used for any other purpose. The procedures that we performed are summarized as follows:

1. We compared the amounts included in item 8 under the caption Alternative II in the letter referred to above with the corresponding amount in the financial statements referred to in the first paragraph.

2. We recomputed from, or reconciled to, the financial statements referred to in the first paragraph the information included in items 7 and 11 under the caption Alternative II in the letter referred to above.

Because the procedures referred to in the preceding paragraph were not sufficient to constitute an audit made in accordance with generally accepted auditing standards, we do not express an opinion on any of the information or amounts listed under the caption Alternative II in the aforementioned letter. In performing the procedures referred to above, however, no matters came to our attention that caused us to believe that the information or amounts included in items 7, 8 and 11 should be adjusted.

Deloitte & Touche

March 30, 1990

Alternative II
($ in Millions)

1.	Sum of current closure and post-closure cost estimates (total of all cost estimates listed above)...........	$ 93.5
2.	Amount of annual aggregate liability coverage to be demonstrated..	$ 24.0
3.	Sum of lines 1 and 2.................................	$ 117.5
4.	Current bond rating of most recent issuance and name of rating service...............Standard & Poors......	AA-
5.	Date of issuance of bond.............................	March 27, 1990
6.	Date of maturity of bond.............................	March 15, 1993
*7.	Tangible net worth (if any portion of the closure or post-closure cost estimates is included in "total liabilities" on your financial statements you may add that portion to this line)...........................	27,856.2
*8.	Total assets in the U.S. (required only if less than 90% of assets are located in the U.S.)...............	131,595.8

		YES	NO
9.	Is line 7 at least $10 million?.................	X	
10.	Is line 7 at least 6 times line 3?..............	X	
*11.	Are at least 90% of assets located in the U.S.? If not, complete line 12.........................		X
12.	Is line 8 at least 6 times line 3?..............	X	

OHIO

EPA ID: OHD020632998
Facility Name: GMC BOC: LORDSTOWN ASSEMBLY
Mailing Address: P.O. BOX 1406
WARREN, OH 44482
Facility Location: 2300 HALLOCK-YOUNG ROAD, County: TRUMBULL
Current closure cost estimate: $463,500

EPA ID: OHD005050273
Facility Name: GMC CENTRAL FOUNDRY: DEFIANCE
Mailing Address: P.O. BOX 70
DEFIANCE, OH 43512
Facility Location: STATE ROUTE 281 EAST, County: DEFIANCE
Current closure cost estimate: $12,100,000
Current post-closure cost estimate: $207,000

EPA ID: OHD980569388
Facility Name: GMC CPC: MORAINE ENGINE
Mailing Address: P. O. BOX 1291
MORAINE, OH 45439
Facility Location: 4100 SPRINGBORO RD., County: MONTGOMERY
Current closure cost estimate: $37,100

U.S. EPA REGION V

OHIO

EPA ID: OHD045557766
Facility Name: GMC DELCO MORAINE NDH: DAYTON NORTH
Mailing Address: 1420 WISCONSIN BOULEVARD
DAYTON, OH 45401
Facility Location: 3100 NEEDMORE ROAD, County: MONTGOMERY
Current closure cost estimate: $119,600

EPA ID: OHD060928561
Facility Name: GMC DELCO MORAINE NDH: DAYTON SOUTH
Mailing Address: 1420 WISCONSIN BOULEVARD
DAYTON, OH 45401
Facility Location: 1420 WISCONSIN BOULEVARD, County: MONTGOMERY
Current closure cost estimate: $131,400

EPA ID: OHD004255410
Facility Name: GMC DELCO PRODUCTS: KETTERING
Mailing Address: P.O. BOX 1042
DAYTON, OH 45420
Facility Location: 2000 FORRER BOULEVARD, County: MONTGOMERY
Current closure cost estimate: $107,800

EPA ID: OHD004294419
Facility Name: GMC INLAND FISHER GUIDE: COLUMBUS
Mailing Address: 200 GEORGESVILLE ROAD
COLUMBUS, OH 43228
Facility Location: 200 GEORGESVILLE ROAD, County: FRANKLIN
Current closure cost estimate: $105,000

U.S. EPA REGION V

OHIO

EPA ID: OHD004201091
Facility Name: GMC INLAND FISHER GUIDE: ELYRIA
Mailing Address: 1400 LOWELL ST.
ELYRIA, OH 44035
Facility Location: 1400 LOWELL STREET, County: LORAIN
Current closure cost estimate: $3,532,200
Current post-closure cost estimate: $805,400

EPA ID: OHD017958604
Facility Name: GMC HARRISON RADIATOR: DAYTON
Mailing Address: P.O. BOX 824
DAYTON, OH 45401
Facility Location: 300 TAYLOR STREET, County: MONTGOMERY
Current closure cost estimate: $789,900
Current post-closure cost estimate: $12,600

EPA ID: OHD000817577
Facility Name: GMC HARRISON RADIATOR: MORAINE
Mailing Address: P.O. BOX 824
DAYTON, OH 45401
Facility Location: 3600 DRYDEN ROAD, County: MONTGOMERY
Current closure cost estimate: $11,000,000
Current post-closure cost estimate: $250,000

EPA ID: OHD000817023
Facility Name: GMC DELCO PRODUCTS: DAYTON
Mailing Address: P.O. BOX 1042
DAYTON, OH 45401
Facility Location: 2701 HOME AVENUE, County: MONTGOMERY
Current closure cost estimate: $49,000

EPA ID: OHD097622336
Facility Name: GMC INLAND FISHER GUIDE: EUCLID
Mailing Address: 20001 EUCLID AVE.
EUCLID, OH 44117
Facility Location: 20001 EUCLID AVENUE, County: CUYAHOGA
Current closure cost estimate: $21,800

U.S. EPA REGION V

OHIO

EPA ID: OHD052151701
Facility Name: GMC DELCO PRODUCTS: VANDALIA
Mailing Address: P.O. BOX 1042
DAYTON, OH 45401
Facility Location: 480 NORTH DIXIE HIGHWAY, County: MONTGOMERY
Current closure cost estimate: $63,200

EPA ID: OHD001880442
Facility Name: GMC DELCO MORAINE NDH: SANDUSKY
Mailing Address: 2509 HAYES AVE.
SANDUSKY, OH 44870
Facility Location: 2509 HAYES AVENUE, County: ERIE
Current closure cost estimate: $29,000

EPA ID: OHD018414292
Facility Name: GMC PACKARD ELECTRIC: WARREN DANA ST.
Mailing Address: P.O. BOX 431
WARREN, OH 44483
Facility Location: 408 DANA STREET, County: TRUMBULL
Current closure cost estimate: $27,000

EPA ID: OHD000817346
Facility Name: GMC PACKARD ELECTRIC: WARREN NORTH RIVER RD.
Mailing Address: P.O. BOX 431
WARREN, OH 44483
Facility Location: LARCHMONT AND NORTH RIVER ROAD, County: TRUMBULL
Current closure cost estimate: $237,900
Current post-closure cost estimate: $620,500

EPA ID: OHD041063074
Facility Name: GMC TRUCK AND BUS: MORAINE ASSEMBLY
Mailing Address: P.O. BOX 1291
DAYTON, OH 45401
Facility Location: 2601 W. STROOP, County: MONTGOMERY
Current closure cost estimate: $307,900

U.S. EPA REGION V

ILLINOIS

EPA ID: ILD005141551
Facility Name: GMC CENTRAL FOUNDRY: DANVILLE
Mailing Address: P.O. BOX 592
DANVILLE, IL 61832
Facility Location: I-74 AT "G" STREET, County: VERMILION
Current closure cost estimate: $86,900

EPA ID: ILD006009690
Facility Name: GMC ELECTRO-MOTIVE: LAGRANGE
Mailing Address: 9301 W. 55TH ST.
LAGRANGE, IL 60525
Facility Location: 9301 W. 55TH STREET, County: COOK
Current closure cost estimate: $1,188,600

U.S. EPA REGION V

INDIANA

EPA ID: IND000806836
Facility Name: GMC ALLISON GAS TURBINE DIVISION
Mailing Address: P.O. BOX 420, S44A
INDIANAPOLIS, IN 46206
Facility Location: 2355 SOUTH TIBBS AVE., County: MARION
Current closure cost estimate: $10,932,200
Current post-closure cost estimate: $1,914,200

EPA ID: IND000806851
Facility Name: GMC DELCO ELECTRONICS: KOKOMO BY PASS PLANT
Mailing Address: ONE CORPORATE CENTER, WH600
KOKOMO, IN 46904-9005
Facility Location: 1800 E. LINCOLN ROAD, County: HOWARD
Current closure cost estimate: $218,800

U.S. EPA REGION V

INDIANA

EPA ID: IND006068050
Facility Name: GMC DELCO ELECTRONICS: KOKOMO PLANT 1
Mailing Address: ONE CORPORATE CENTER, M.S. WH600
KOKOMO, IN 46904-9005
Facility Location: 700 E. FIRMIN STREET, County: HOWARD
Current closure cost estimate: $27,800

EPA ID: IND000806844
Facility Name: GMC DELCO ELECTRONICS: KOKOMO PLANT 5
Mailing Address: ONE CORPORATE CENTER, WH600
KOKOMO, IN 46904-9005
Facility Location: 1723 N. WASHINGTON STREET, County: HOWARD
Current closure cost estimate: $73,200

EPA ID: IND980503825
Facility Name: GMC DELCO REMY: ANDERSON ACRE
Mailing Address: 2401 COLUMBUS AVENUE
ANDERSON, IN 46018
Facility Location: 2401 COLUMBUS AVE., County: MADISON
Current closure cost estimate: $232,600

EPA ID: IND000806877
Facility Name: GMC DELCO REMY: MUNCIE
Mailing Address: 4500 S. DELAWARE DR.
MUNCIE, IN 47302
Facility Location: 4500 SOUTH DELAWARE DRIVE, County: DELAWARE
Current closure cost estimate: $202,400

EPA ID: IND980700801
Facility Name: GMC INLAND FISHER GUIDE: ANDERSON
Mailing Address: 2915 PENDLETON AVE.
ANDERSON, IN 46011
Facility Location: 2915 PENDLETON AVENUE, County: MADISON
Current closure cost estimate: $152,900

U.S. EPA REGION V

INDIANA

EPA ID: IND079583720
Facility Name: GMC TRUCK & BUS OPERATIONS: INDIANAPOLIS
Mailing Address: P.O. BOX 388
INDIANAPOLIS, IN 46206
Facility Location: 340 WHITE RIVER PARKWAY, County: MARION
Current closure cost estimate: $31,300

EPA ID: IND00811616
Facility Name: UNIVERSAL TOOL & ENGINEERING COMPANY (OWNER)
(GMC: DELCO REMY ANDERSON - OPERATOR)
Mailing Address: 8850 HAGUE ROAD
INDIANAPOLIS, IN 46256
Facility Location: 8850 HAGUE ROAD, County: MARION
Current closure cost estimate: $41,600

U.S. EPA REGION V

MICHIGAN

EPA ID: MID980568745
Facility Name: GMC AC ROCHESTER: FLINT AVERILL AVE.
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 4134 DAVISON ROAD, County: GENESEE
Current closure cost estimate: $667,300

EPA ID: MID005356647
Facility Name: GMC AC ROCHESTER: FLINT DORT HWY.
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 1300 N. DORT HIGHWAY, County: GENESEE
Current closure cost estimate: $67,400

EPA ID: MID980568620
Facility Name: GMC AC ROCHESTER: FLINT ENGINEERING
Mailing Address: 1300 N. DORT HWY.
FLINT, MI 48556
Facility Location: 1601 NORTH AVERILL AVENUE, County: GENESSE
Current closure cost estimate: $74,700

EPA ID: MID005356654
Facility Name: GMC AC ROCHESTER: FLINT WEST
Mailing Address: 300 N. CHEVROLET AVE.
FLINT, MI 48555
Facility Location: 300 NORTH CHEVROLET AVENUE, County: GENESEE
Current closure cost estimate: $50,300

U.S. EPA REGION V

MICHIGAN

EPA ID: MID005356712
Facility Name: GMC BOC: FLINT OPERATIONS
Mailing Address: 902 E. HAMILTON
FLINT, MI 48550
Facility Location: 902 EAST HAMILTON, County: GENESEE
Current closure cost estimate: $515,000

EPA ID: MID000718544
Facility Name: GMC BOC: LAKE ORION
Mailing Address: P.O. BOX 100
PONTIAC, MI 48056
Facility Location: 4555 GIDDINGS ROAD, County: OAKLAND
Current closure cost estimate: $202,700

EPA ID: MID005356894
Facility Name: GMC BOC: LANSING PLANT 1
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 920 TOWNSEND STREET, County: INGHAM
Current closure cost estimate: $43,400

EPA ID: MID005356704
Facility Name: GMC BOC: CADILLAC CLARK STREET
Mailing Address: 2860 CLARK STREET
DETROIT, MI 48232
Facility Location: 2860 CLARK STREET, County: WAYNE
Current closure cost estimate: $98,500

U.S. EPA REGION V

MICHIGAN

EPA ID: MID980700827
Facility Name: GMC BOC: LANSING PLANT 2 & 3
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 2800 & 2801 W. SAGINAW STREET, County: INGHAM
Current closure cost estimate: $111,700

EPA ID: MID980700843
Facility Name: GMC BOC: LANSING PLANT 5
Mailing Address: 920 TOWNSEND ST.
LANSING, MI 48921
Facility Location: 2901 SOUTH CANAL ROAD, County: EATON
Current closure cost estimate: $19,300

EPA ID: MID041793340
Facility Name: GMC CENTRAL FOUNDRY: SAGINAW GREY IRON & NODULAR
Mailing Address: 1629 NORTH WASHINGTON AVENUE
SAGINAW, MI 48605-5073
Facility Location: 2100 VETERANS MEMORIAL PARKWAY, County: SAGINAW
Current closure cost estimate: $39,200

EPA ID: MID005356696
Facility Name: GMC CENTRAL FOUNDRY: SAGINAW MALLEABLE IRON
Mailing Address: 77 W. CENTER ST.
SAGINAW, MI 48605
Facility Location: 77 W. CENTER STREET, County: SAGINAW
Current closure cost estimate: $80,400

U.S. EPA REGION V

MICHIGAN

EPA ID: MID005356688
Facility Name: GMC CPC: BAY CITY
Mailing Address: 100 FITZGERALD ST.
BAY CITY, MI 48708
Facility Location: 100 FITZGERALD STREET, County: BAY
Current closure cost estimate: $95,000

EPA ID: MID005356886
Facility Name: GMC CPC: PONTIAC
Mailing Address: ONE PONTIAC PLAZA
PONTIAC, MI 48053
Facility Location: ONE PONTIAC PLAZA, County: OAKLAND
Current closure cost estimate: $81,200

EPA ID: MID005356910
Facility Name: GMC CPC: PONTIAC FIERO ASSEMBLY
Mailing Address: 900 BALDWIN AVE.
PONTIAC, MI 48058
Facility Location: 900 BALDWIN AVENUE, County: OAKLAND
Current closure cost estimate: $102,000

EPA ID: MID000809905
Facility Name: GMC CPC: ROMULUS
Mailing Address: 36880 ECORSE RD.
ROMULUS, MI 48174
Facility Location: 36880 ECORSE ROAD, County: WAYNE
Current closure cost estimate: $47,500

U.S. EPA REGION V

MICHIGAN

EPA ID: MID005356845
Facility Name: GMC DELCO MORAINE NDH: SAGINAW MANUFACTURING
Mailing Address: 2328 E. GENESEE AVE.
SAGINAW, MI 48601
Facility Location: 2328 EAST GENESEE AVENUE, County: SAGINAW
Current closure cost estimate: $40,000

EPA ID: MID005356621
Facility Name: GMC DELCO PRODUCTS: LIVONIA
Mailing Address: 13000 ECKLES RD.
LIVONIA, MI 48151
Facility Location: 13000 ECKLES ROAD, County: WAYNE
Current closure cost estimate: $276,000

EPA ID: MID005356860
Facility Name: GMC INLAND FISHER GUIDE: FLINT COLDWATER RD.
Mailing Address: 1245 E. COLDWATER RD
FLINT, MI 48559-0001
Facility Location: 1245 EAST COLDWATER ROAD, County: GENESEE
Current closure cost estimate: $3,036,800
Current post-closure cost estimate: $870,600

U.S. EPA REGION V

MICHIGAN

EPA ID: MID082220757
Facility Name: GMC GM PROVING GROUND: MILFORD
Mailing Address: 3300 GENERAL MOTORS RD.
MILFORD, MI 48042
Facility Location: 3300 GENERAL MOTORS RD., County: OAKLAND
Current closure cost estimate: $74,100

EPA ID: MID050615996
Facility Name: GMC GM TECHNICAL CENTER: WARREN
Mailing Address: 6250 CHICAGO RD.
WARREN, MI 48090-9005
Facility Location: 29999 VAN DYKE, County: MACOMB
Current closure cost estimate: $402,600

U.S. EPA REGION V

MICHIGAN

EPA ID: MID084571256
Facility Name: GMC INLAND FISHER GUIDE: ADRIAN PLANT
Mailing Address: 1450 E. BEECHER STREET
ADRIAN, MI 48221
Facility Location: 1450 E. BEECHER STREET, County: LENAWEE
Current closure cost estimate: $26,800

EPA ID: MID020105565
Facility Name: GMC SAGINAW: DETROIT FORGE
Mailing Address: 8435 ST. AUBIN
DETROIT, MI 48212
Facility Location: 8435 ST. AUBIN, County: WAYNE
Current closure cost estimate: $29,000

EPA ID: MID000721738
Facility Name: GMC AC ROCHESTER: COOPERSVILLE
Mailing Address: 999 RANDALL STREET
COOPERSVILLE, MI 49404
Facility Location: 999 RANDALL STREET, County: OTTAWA
Current closure cost estimate: $2,000

EPA ID: MID017079625
Facility Name: GMC AC ROCHESTER: GRAND RAPIDS
Mailing Address: 2100 BURLINGAME AVENUE SW
GRAND RAPIDS, MI 49501
Facility Location: 2100 BURLINGAME AVENUE SW, County: KENT
cost closure cost estimate: $89,500

EPA ID: MID086744802
Facility Name: GMC SAGINAW: DETROIT
Mailing Address: 1840 HOLBROOK AVENUE
DETROIT, MI 48212
Facility Location: 1840 HOLBROOK AVENUE, County: WAYNE
Current closure cost estimate: $1,200,000
Current post-closure cost estimate: $120,000

U.S. EPA REGION V

MICHIGAN

EPA ID: MID003912920
Facility Name: GMC SERVICE PARTS OPER.: DRAYTON PLAINS
Mailing Address: 6060 W. BRISTOL RD.
FLINT, MI 48554
Facility Location: 5260 WILLIAMS LAKE ROAD, County: OAKLAND
Current closure cost estimate: $72,000

EPA ID: MID003906773
Facility Name: GMC SERVICE PARTS OPER.: FLINT
Mailing Address: 6060 W. BRISTOL RD.
FLINT, MI 48554
Facility Location: 6060 WEST BRISTOL ROAD, County: GENESEE
Current closure cost estimate: $65,500

EPA ID: MID005356902
Facility Name: GMC TRUCK & BUS: PONTIAC CENTRAL/EAST
Mailing Address: 660 SOUTH BOULEVARD EAST
PONTIAC, MI 48053
Facility Location: 660 SOUTH BOULEVARD EAST, County: OAKLAND
Current closure cost estimate: $224,000

EPA ID: MID980568836
Facility Name: GMC TRUCK & BUS: PONTIAC WEST
Mailing Address: 275 FRANKLIN ROAD
PONTIAC, MI 48053
Facility Location: 660 SOUTH BOULEVARD EAST, County: OAKLAND
Current closure cost estimate: $56,000

U.S. EPA REGION V

MICHIGAN

EPA ID: MID005356951
Facility Name: GMC TRUCK & BUS: VAN SLYKE COMPLEX
Mailing Address: G-2238 W. BRISTOL RD.
FLINT, MI 48553
Facility Location: VAN SLYKE AT ATHERTON ROAD, County: GENESEE
Current closure cost estimate: $1,507,000

General Motors Corporation

RECEIVED

MAR 31 1986

U.S. EPA REGION 5
OFFICE OF REGIONAL ADMINISTRATOR

RECEIVED
7 1986
U.S. EPA, REGION V
WASTE MANAGEMENT DIVISION
HAZARDOUS WASTE ENFORCEMENT BRANCH

Mr. Valdas V. Adamkus
Regional Administrator
U.S. EPA Region V
230 S. Dearborn
Chicago, IL 60604

Dear Mr. Adamkus:

I am the chief financial officer of General Motors Corporation, 3044 West Grand Boulevard, Detroit, Michigan 48202. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Subpart H of 40 CFR Parts 264 and 265.

The owner or operator identified above is the owner or operator of the following facilities for which liability coverage is being demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265: See Attachment A.

1. The owner or operator identified above owns or operates the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by the test are shown for each facility: See Attachment A.

2. The owner or operator identified above guarantees, through the corporate guarantee specified in Subpart H of 40 CFR Parts 264 and 265, the closure and post-closure care of the following facilities owned or operated by its subsidiaries. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility: None.

3. In States where EPA is not administering the financial requirements of Subpart H of 40 CFR Parts 264 and 265, this owner or operator is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by such a test are shown for each facility: See Attachment B.

General Motors Building 3044 West Grand Boulevard Detroit, Michigan 48202

U.S. EPA ID #: MID980[illegible]8620 ✓

GMC AC SPARK PLUG DIV DAVISON ENG
300 NORTH DORT HIGHWAY
FLINT MI 48556

U.S. EPA ID #: MID005356647 ✓

GMC AC SPARK PLUG DIV DORT HWY
1300 N DORT HWY
FLINT MI 48556

U.S. EPA ID #: MID980568570 ✓

GMC AC SPARK PLUG DIV WASTE TRMT
1300 N DORT HIGHWAY
FLINT MI 48556

U.S. EPA ID #: MID005356795

GMC ASSEMBLY DIV ✓
2625 TYLER ROAD
YPSILANTI MI 48197

U.S. EPA ID #: MID005356696 ✓

GMC CENTRAL FOUNDRY DIV SAG MAL IR*
77 W CENTER ST
SAGINAW MI 48605

U.S. EPA ID #: MID076380583 ✓

GMC CHEVROLET DETROIT ASSEMBLY
601 PIQUETTE
DETROIT MI 48202

U.S. EPA ID #: MID005356654 ✓

GMC CHEVROLET FLINT MFG
300 NORTH CHEVROLET AVENUE
FLINT MI 48555

U.S. EPA ID #: MID041793340 ✓

GMC CHEVROLET SAGINAW CASTING & PA*
2100 VETERANS MEMORIAL PARKWAY
SAGINAW MI 48601

U.S. EPA ID #: MID000809905 ✓

GMC DETROIT DIESEL ALLISON ROMULUS*
36880 ECORSE RD
ROMULUS MI 48174

U.S. EPA ID #: MID005356712 ✓

GMC BUICK MOTOR DIV
902 E HAMILTON ST BLDG 85
FLINT MI 48550

U.S. EPA ID #: MID084571256 ✓

GMC CHEVROLET ADRIAN MFG
1450 E BEECHER ST
ADRIAN MI 49221

U.S. EPA ID #: MID020105565 ✓

GMC CHEVROLET DETROIT FORGE
8435 ST AUBIN
DETROIT MI 48212

U.S. EPA ID #: MID005356951 ✓

GMC CHEVROLET FLINT VAN SLYKE COMP*
G-3248 VAN SLYKE RD
FLINT MI 48552

U.S. EPA ID #: MID005356845 ✓

GMC CHEVROLET SAGINAW MFG
2328 EAST GENESEE AVE
SAGINAW MI 48605

U.S. EPA ID #: MID0057[illegible]5860 ✓

GMC FISHER BODY DIV COLDWATER RD
1245 E COLDWATER RD
LINT MI 48559

U.S. EPA ID #: MID000718544 ✓

GMC GMAD LAKE ORION TWP PLT
PO BOX 347
LAKE ORION MI 48035

U.S. EPA ID #: MID005356704 ✓

GMC CADILLAC MOTOR CAR CLARK PLT
2860 CLARK ST
DETROIT MI 48232

U.S. EPA ID #: MID005356688 ✓

GMC CHEVROLET BAY CITY
100 FITZGERALD ST
BAY CITY MI 48706

U.S. EPA ID #: MID086744802 ✓

GMC CHEVROLET DETROIT GEAR AND AXLE
1840 HOLBROOK AVE
DETROIT MI 48212

U.S. EPA ID #: MID005356621 ✓

GMC CHEVROLET LIVONIA
13000 ECKLES RD
LIVONIA MI 48151

U.S. EPA ID #: MID005356803 ✓

GMC DETROIT DIESEL ALLISON DIV RED*
3400 WEST OUTER DR
DETROIT MI 48239

U.S. EPA #: MID005356787 ✓

GMC FISHER BODY DIV FORT ST
6307 WEST FORT STREET
DETROIT MI 48209

U.S. EPA ID #: MID000724740 ✓

GMC HYDRA-MATIC DIV
ONE HYDRA-MATIC DRIVE
THREE RIVERS MI 49093

U.S. EPA ID #: MID000718551 ✓

GMC HYDRA-MATIC DIV THREE RIVERS P*
ONE HYDRA-MATIC DR
THREE RIVERS MI 49093

U.S. EPA ID #: MID005356694 ✓

GMC OLDSMOBILE DIV PLT 1
P O BOX 30061
LANSING MI 48909

U.S. EPA ID #: MID082220757 ✓

GMC PROVING GROUND MILFORD
HICKORY RIDGE & GM ROADS
MILFORD MI 48042

U.S. EPA ID #: MID980568836 ✓

GMC TRUCK & COACH DIV PONTIAC WEST
660 S BLVD E
PONTIAC MI 48053

U.S. EPA ID #: MID980700843 ✓

GMC OLDSMOBILE DIV PLT 5
P O BOX 30061
LANSING MI 48909

U.S. EPA ID #: MID0007[illegible]1738 ✓

GMC ROCHESTER PROD DIV COOPERSVILL*
2100 BURLINGAME
RAND RAPIDS MI 49501

U.S. EPA ID #: MID003912920 ✓

GMC WHS & DIST DIV DRAYTON PLAINS
6060 W BRISTOL ROAD
FLINT MI 48554

U.S. EPA ID #: MID980700827 ✓

GMC OLDSMOBILE DIV PLTS 2 & 3
P O BOX 30061
LANSING MI 48909

U.S. EPA ID #: MID017079625 ✓

GMC ROCHESTER PROD DIV WYOMING PLT
2100 BURLINGAME
GRAND RAPIDS MI 49501

U.S. EPA ID #: MID005356902 ✓

GMC TRUCK & BUS GROUP
660 S BLVD E
PONTIAC MI 48053

U.S. EPA ID #: MID003906773 ✓

GMC WHS & DIST DIV FLINT
6060 W BRISTOL ROAD
FLINT MI 48554

ATTACHMENT A

TOTAL A	$25,693,071.00
TOTAL B	7,768,220.00
GRAND TOTAL	$33,461,291.00

GENERAL MOTORS CORPORATION FACILITIES - U.S. EPA REGION 2

NYD012871489

Facility EPA I.D. Number

GMC CENTRAL FOUNDRY DIVISION MASSENA PLANT

Name of Facility

PO BOX 460

Facility Mailing Address (Street or P.O. Box)

MASSENA	NY	13662
City or Town	State	Zip Code

ROOSEVELTOWN HWY

Facility Location (Street, Route No. or other specific identifier)

MASSENA	ST. LAWRENCE	NY	13662
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 14,000.00

NYD002127157

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION TONAWANDA PLANT

Name of Facility

PO BOX 21

Facility Mailing Address (Street or P.O. Box)

BUFFALO	NY	14240
City or Town	State	Zip Code

RIVER RD

Facility Location (Street, Route No. or other specific identifier)

TONAWANDA	ERIE	NY	14240
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 48,000.00

37PMZ/0629
6/28/82

NYD002215226

Facility EPA I.D. Number

GMC DELCO PRODUCTS DIVISION ROCHESTER PLANT

Name of Facility

PO BOX 230

Facility Mailing Address (Street or P.O. Box)

ROCHESTER	NY	14601
City or Town	State	Zip Code

1555 LYELL AVE

Facility Location (Street, Route No. or other specific identifier)

ROCHESTER	MONROE	NY	14606
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 16,500.00

NJD068699107

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION NEW BRUNSWICK PLANT

Name of Facility

PO BOX 911

Facility Mailing Address (Street or P.O. Box)

NEW BRUNSWICK	NJ	08903
City or Town	State	Zip Code

186 JERSEY AVE

Facility Location (Street, Route No. or other specific identifier)

NEW BRUNSWICK	MIDDLESEX	NY	08903
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 810,000.00

37PMZ/0629a
6/29/82

NYD002239440

Facility EPA I.D. Number

GMC FISHER BODY DIVISION SYRACUSE PLANT

Name of Facility

PO BOX 4869

Facility Mailing Address (Street or P.O. Box)

SYRACUSE	NY	13221
City or Town	State	Zip Code

1000 TOWN LINE RD

Facility Location (Street, Route No. or other specific identifier)

SYRACUSE	ONONDAGA	NY	13221
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 27,925.00

NJD002353951

Facility EPA I.D. Number

GMC FISHER BODY DIVISION TRENTON PLANT

Name of Facility

PO BOX 9019

Facility Mailing Address (Street or P.O. Box)

TRENTON	NJ	08650
City or Town	State	Zip Code

1445 PARKWAY AVE

Facility Location (Street, Route No. or other specific identifier)

TRENTON	MERCER	NJ	08650
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 2,389,942.00

37PMZ/0629b
6/29/82

NJD002186690
Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION LINDEN PLANT
Name of Facility

1016 W EDGAR RD
Facility Mailing Address (Street or P.O. Box)

LINDEN	NJ	07036
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	UNION		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 15,000.00

NYD002026565
Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION TARRYTOWN PLANT
Name of Facility

BEEKMAN AVE
Facility Mailing Address (Street or P.O. Box)

NORTH TARRYTOWN	NY	10591
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	WESTCHESTER		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 15,000.00

37PMZ/0629c
6/29/82

NYT370010209

Facility EPA I.D. Number

GMC HARRISON RADIATOR DIVISION WASTEWATER TREATMENT PLANT

Name of Facility

200 UPPER MOUNTAIN RD

Facility Mailing Address (Street or P.O. Box)

LOCKPORT	NY	14094
City or Town	State	Zip Code

5707 UPPER MOUNTAIN RD

Facility Location (Street, Route No. or other specific identifier)

LOCKPORT	NIAGRA	NY	14094
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ NA

NYD002126852

Facility EPA I.D. Number

GMC HARRISON RADIATOR DIVISION WEST LOCKPORT PLANT

Name of Facility

200 UPPER MOUNTAIN RD

Facility Mailing Address (Street or P.O. Box)

LOCKPORT	NY	14094
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	NIAGRA		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 7,743,305.00

37PMZ/0629d
6/29/82

NYD000813436

Facility EPA I.D. Number

GMC ROCHESTER PRODUCTS DIVISION LEE ROAD PLANT

Name of Facility

PO BOX 1790

Facility Mailing Address (Street or P.O. Box)

ROCHESTER	NY	14603
City or Town	State	Zip Code

500 LEE RD

Facility Location (Street, Route No. or other specific identifier)

ROCHESTER	MONROE	NY	14606
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 17,800.00

NYD002215234

Facility EPA I.D. Number

GMC ROCHESTER PRODUCTS DIVISION LEXINGTON AVENUE PLANT

Name of Facility

PO BOX 1790

Facility Mailing Address (Street or P.O. Box)

ROCHESTER	NY	14603
City or Town	State	Zip Code

1000 LEXINGTON AVE

Facility Location (Street, Route No. or other specific identifier)

ROCHESTER	MONROE	NY	14603
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 147,630.00

37PMZ/0629e
6/29/82

WVD044145209

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION MARTINSBURG PLANT

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

1000 WARM SPRINGS AVE

Facility Location (Street, Route No. or other specific identifier)

MARTINSBURG	BERKELY	WV	25401
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 75,000.00

*

Facility EPA I.D. Number

*

Name of Facility

*

Facility Mailing Address (Street or P.O. Box)

*

City or Town	State	Zip Code

*

Facility Location (Street, Route No. or other specific identifier)

*

City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $*

37PMZ/0629f
6/29/82

MIT270010226
Facility EPA I.D. Number

GMC AC SPARK PLUG DIVISION AVERILL AVE PLANT
Name of Facility

1300 N DORT HWY
Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48556
City or Town	State	Zip Code

4143 DAVISON RD
Facility Location (Street, Route No. or other specific identifier)

FLINT	GENESEE	MI	48556
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 38,616.00

MIT005356647
Facility EPA I.D. Number

GMC AC SPARK PLUG DIVISION DORT HWY PLANT
Name of Facility

1300 N DORT HWY
Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48556
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	GENESEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 37,536.00

37PMZ/0629g
6/29/82

MIT270010259

Facility EPA I.D. Number

GMC AC SPARK PLUG DIVISION ENGINEERING PLANT

Name of Facility

1300 N DORT HWY

Facility Mailing Address (Street or P.O. Box)

City or Town	State	Zip Code
FLINT	MI	48556

1601 N AVERILL AVE

Facility Location (Street, Route No. or other specific identifier)

City or Town	County	State	Zip Code
FLINT	GENESEE	MI	48556

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 5,050.00

MIT270010242

Facility EPA I.D. Number

GMC AC SPARK PLUG DIVISION WASTEWATER TREATMENT PLANT

Name of Facility

1300 N DORT HWY

Facility Mailing Address (Street or P.O. Box)

City or Town	State	Zip Code
FLINT	MI	48556

3026 ROBERT T LONGWAY BLVD

Facility Location (Street, Route No. or other specific identifier)

City or Town	County	State	Zip Code
FLINT	GENESEE	MI	48556

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ NA

37PMZ/0629h
6/29/82

MIT270010044
Facility EPA I.D. Number

GMC BUICK MOTOR DIVISION BUILDING 85
Name of Facility

902 E HAMILTON
Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48550
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	GENESEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1,450,000.00

CURRENT POST-CLOSURE COST ESTIMATE OF FACILITY $ 165,000.00

MID005356712
Facility EPA I.D. Number

GMC BUICK MOTOR DIVISION DIVISION 14
Name of Facility

902 E HAMILTON
Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48550
City or Town	State	Zip Code

STEAM GENERATING PLANT
Facility Location (Street, Route No. or other specific identifier)

FLINT	GENESEE	MI	48550
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 73,000.00

37PMZ/0629i
6/29/82

MID005356704

Facility EPA I.D. Number

GMC CADILLAC MOTOR CAR DIVISION CLARK PLANT

Name of Facility

2860 CLARK ST

Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48232
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 31,430.00

IND006036099

Facility EPA I.D. Number

GMC CENTRAL FOUNDRY DIVISION BEDFORD PLANT

Name of Facility

PO BOX 271

Facility Mailing Address (Street or P.O. Box)

BEDFORD	IN	47421
City or Town	State	Zip Code

NORTH JACKSON ST

Facility Location (Street, Route No. or other specific identifier)

BEDFORD	LAWRENCE	IN	47421
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 14,200.00

37PMZ/0629j
6/29/82

OHD005050273

Facility EPA I.D. Number

GMC CENTRAL FOUNDRY DIVISION DEFIANCE PLANT

Name of Facility

PO BOX 70

Facility Mailing Address (Street or P.O. Box)

DEFIANCE	OH	43512
City or Town	State	Zip Code

STATE ROUTE 281 EAST

Facility Location (Street, Route No. or other specific identifier)

DEFIANCE	DEFIANCE	OH	43512
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 45,000.00

MID085470102

Facility EPA I.D. Number

GMC CENTRAL FOUNDRY DIVISION PONTIAC PLANT

Name of Facility

PO BOX 900

Facility Mailing Address (Street or P.O. Box)

PONTIAC	MI	48056
City or Town	State	Zip Code

701 GLENWOOD

Facility Location (Street, Route No. or other specific identifier)

PONTIAC	OAKLAND	MI	48056
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 432,000.00

37PMZ/0629k
6/29/82

GENERAL MOTC⌐S CORPORATION FACILITIES - U.S. EPA REGION 5

MID005356696

Facility EPA I.D. Number

GMC CENTRAL FOUNDRY DIVISION SAGINAW PLANT

Name of Facility

77 W CENTER ST

Facility Mailing Address (Street or P.O. Box)

SAGINAW	MI	48605
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	SAGINAW		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 40,040.00

MID084571256

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION ADRIAN PLANT

Name of Facility

1450 E BEECHER ST

Facility Mailing Address (Street or P.O. Box)

ADRIAN	MI	49221
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	LENAWEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 18,395.00

37PMZ/06291
6/29/82

MID005356688

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION BAY CITY PLANT

Name of Facility

100 FITZGERALD ST

Facility Mailing Address (Street or P.O. Box)

BAY CITY	MI	48707
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	BAY		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 8,000.00

MID020105565

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION DETROIT FORGE PLANT

Name of Facility

8435 ST AUBIN

Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48212
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 20,000.00

37PMZ/0629m
6/29/82

MID086744802

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION DETROIT GEAR & AXLE PLANT

Name of Facility

1840 HOLBROOK

Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48212
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 80,000.00

MID005356654

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION FLINT MFG PLANTS

Name of Facility

300 N CHEVROLET AVE

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48555
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	GENESEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 52,000.00

37PMZ/0629n
6/29/82

MID005356951

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION FLINT VAN SLYKE COMPLEX PLANTS

Name of Facility

G 3248 VAN SLYKE RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48552
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	GENESEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 404,900.00

MID005356621

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION LIVONIA PLANT

Name of Facility

13000 ECKLES RD

Facility Mailing Address (Street or P.O. Box)

LIVONIA	MI	48151
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 6,122.00

37PMZ/0629o
6/29/82

OHD041063074

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION MORAINE ASSEMBLY PLANT

Name of Facility

PO BOX 1291

Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

2601 W STROOP

Facility Location (Street, Route No. or other specific identifier)

DAYTON	MONTGOMERY	OH	45439
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 212,500.00

OHT400011672

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION MORAINE ENGINE PLANT

Name of Facility

PO BOX 1291

Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

4100 SPRINGBORO PIKE

Facility Location (Street, Route No. or other specific identifier)

MORAINE	MONTGOMERY	OH	45439
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 67,800.00

37PMZ/0629p
6/29/82

IND006066286
Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION MUNCIE PLANT
Name of Facility

PO BOX 2527
Facility Mailing Address (Street or P.O. Box)

MUNCIE	IN	47302
City or Town	State	Zip Code

1200 W EIGHT ST
Facility Location (Street, Route No. or other specific identifier)

MUNCIE	DELAWARE	IN	47302
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 26,000.00

MID041793340
Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION SAGINAW CASTING & PARTS PLANTS
Name of Facility

2100 VERERANS MEMORIAL PARKWAY
Facility Mailing Address (Street or P.O. Box)

SAGINAW	MI	48601
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	SAGINAW		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 29,500.00

37PMZ/0629q
6/29/82

MID005356845

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION SAGINAW MFG PLANT

Name of Facility

2328 E GENESEE AVE

Facility Mailing Address (Street or P.O. Box)

SAGINAW	MI	48603
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	SAGINAW		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 10,000.00

OHD006041371

Facility EPA I.D. Number

GMC CHEVROLET MOTOR DIVISION TOLEDO PLANT

Name of Facility

PO BOX 909

Facility Mailing Address (Street or P.O. Box)

TOLEDO	OH	43692
City or Town	State	Zip Code

1455 W ALEXIS RD

Facility Location (Street, Route No. or other specific identifier)

TOLEDO	LUCAS	OH	43612
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 75,000.00

37PMZ/0629r
6/29/82

IND006068050

Facility EPA I.D. Number

GMC DELCO ELECTRONICS DIVISION KOKOMO BYPASS PLANT

Name of Facility

700 E FIRMIN ST MS 9152

Facility Mailing Address (Street or P.O. Box)

KOKOMO	IN	46902
City or Town	State	Zip Code

1800 E LINCOLN RD

Facility Location (Street, Route No. or other specific identifier)

KOKOMO	HOWARD	IN	46902
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 110,025.00

IND000806844

Facility EPA I.D. Number

GMC DELCO ELECTRONICS DIVISION PLANT 1

Name of Facility

700 E FIRMIN ST MS 9152

Facility Mailing Address (Street or P.O. Box)

KOKOMO	IN	46902
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	HOWARD		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,275.00

37PMZ/0629s
6/29/82

IND000806869
Facility EPA I.D. Number

GMC DELCO ELECTRONICS DIVISION PLANT 5
Name of Facility

700 E FIRMIN ST MS 9152
Facility Mailing Address (Street or P.O. Box)

KOKOMO	IN	46902
City or Town	State	Zip Code

1723 N WASHINGTON ST
Facility Location (Street, Route No. or other specific identifier)

KOKOMO	HOWARD	IN	46902
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1,375.00

OHD060928561
Facility EPA I.D. Number

GMC DELCO MORAINE DIVISION DAYTON SOUTH PLANT
Name of Facility

1420 WISCONSIN BLVD
Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	MONTGOMERY		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 60,200.00

37PMZ/0629t
6/29/82

OHD045557766
Facility EPA I.D. Number

GMC DELCO MORAINE DIVISION DAYTON NORTH PLANT
Name of Facility

1420 WISCONSIN BLVD
Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

3100 NEEDMORE RD
Facility Location (Street, Route No. or other specific identifier)

DAYTON	MONTGOMERY	OH	45414
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 59,000.00

OHD000817585
Facility EPA I.D. Number

GMC DELCO PRODUCTS DIVISION DAYTON PLANT XX
Name of Facility

PO BOX 1042
Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

1619 KUNTZ RD
Facility Location (Street, Route No. or other specific identifier)

DAYTON	MONTGOMERY	OH	45404
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,500.00

37PMZ/0629u
6/29/82

OHD004255410

Facility EPA I.D. Number

GMC DELCO PRODUCTS DIVISION KETTERING PLANTS

Name of Facility

PO BOX 1042

Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

2000 FORRER BLVD

Facility Location (Street, Route No. or other specific identifier)

DAYTON	MONTGOMERY	OH	45420
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 64,000.00

INT190011023

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION ANDERSON ACRE PLANT

Name of Facility

2401 COLUMBUS AVE

Facility Mailing Address (Street or P.O. Box)

ANDERSON	IN	46018
City or Town	State	Zip Code

ACRE AREA

Facility Location (Street, Route No. or other specific identifier)

ANDERSON	MADISON	IN	46018
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 77,000.00

37PMZ/0629v
6/29/82

INT190011015

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION COLUMBUS AVE PLANTS

Name of Facility

2401 COLUMBUS AVE

Facility Mailing Address (Street or P.O. Box)

ANDERSON	IN	46018
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	MADISON		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,000.00

IND000806877

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION MUNCIE PLANT

Name of Facility

4500 SOUTH DELAWARE DR

Facility Mailing Address (Street or P.O. Box)

MUNCIE	IN	47302
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	DELAWARE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 758,900.00

37PMZ/0629w
6/29/82

GENERAL MOTC⁻S CORPORATION FACILITIES - U. . EPA REGION 5

IND006413348

Facility EPA I.D. Number

GMC DETROIT DIESEL ALLISON DIVISION PLANT 3

Name of Facility

PO BOX 894 P-12

Facility Mailing Address (Street or P.O. Box)

INDIANAPOLIS	IN	46206
City or Town	State	Zip Code

4700 W TENTH ST

Facility Location (Street, Route No. or other specific identifier)

INDIANAPOLIS	MARION	IN	46206
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 38,700.00

IND000806836

Facility EPA I.D. Number

GMC DETROIT DIESEL ALLISON DIVISION PLANT 5

Name of Facility

PO BOX 894 P-12

Facility Mailing Address (Street or P.O. Box)

INDIANAPOLIS	IN	46206
City or Town	State	Zip Code

2355 S TIBBS AVE

Facility Location (Street, Route No. or other specific identifier)

INDIANAPOLIS	MARION	IN	46206
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 103,500.00

37PMZ/0629x
6/29/82

GENERAL MOT...S CORPORATION FACILITIES - U.S. EPA REGION 5

IND094469913

Facility EPA I.D. Number

GMC DETROIT DIESEL ALLISON DIVISION PLANT 8

Name of Facility

PO BOX 894 P-12

Facility Mailing Address (Street or P.O. Box)

INDIANAPOLIS	IN	46206
City or Town	State	Zip Code

2001 S TIBBS AVE

Facility Location (Street, Route No. or other specific identifier)

INDIANAPOLIS	MARION	IN	46206
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1,500.00

IND000806802

Facility EPA I.D. Number

GMC DETROIT DIESEL ALLISON DIVISION PLANTS 12 & 14

Name of Facility

PO BOX 894 P-12

Facility Mailing Address (Street or P.O. Box)

INDIANAPOLIS	IN	46206
City or Town	State	Zip Code

901 GRANDE AVE

Facility Location (Street, Route No. or other specific identifier)

INDIANAPOLIS	MARION	IN	46206
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 5,450.00

37PMZ/0629y
6/29/82

MID005356803
Facility EPA I.D. Number

GMC DETROIT DIESEL ALLISON DIVISION REDFORD PLANT
Name of Facility

13400 W OUTER DRIVE
Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48239
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 36,400.00

MID000809905
Facility EPA I.D. Number

GMC DETROIT DIESEL ALLISON DIVISION ROMULUS PLANT
Name of Facility

36880 ECORSE RD
Facility Mailing Address (Street or P.O. Box)

ROMULUS	MI	48174
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 48,585.00

37PMZ/0629z
6/29/82

OHD004206231

Facility EPA I.D. Number

GMC FISHER BODY DIVISION CLEVELAND COIT RD PLANT

Name of Facility

E 140 & COIT RD

Facility Mailing Address (Street or P.O. Box)

CLEVELAND	OH	44110
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	CUYAHOGA		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 27,600.00

MID005356860

Facility EPA I.D. Number

GMC FISHER BODY DIVISION COLDWATER RD PLANT

Name of Facility

1245 E COLDWATER RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48559
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	GENESEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 2,648,000.00

37PMZ/0629aa
6/29/82

GENERAL MOT 'S CORPORATION FACILITIES - (. EPA REGION 5

OHD004294419

Facility EPA I.D. Number

GMC FISHER BODY DIVISION COLUMBUS PLANT

Name of Facility

200 GEORGESVILLE RD

Facility Mailing Address (Street or P.O. Box)

COLUMBUS	OH	43228
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	FRANKLIN		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 7,700.00

MIT270010077

Facility EPA I.D. Number

GMC FISHER BODY DIVISION DETROIT CENTRAL PLANT 21

Name of Facility

6051 HASTINGS

Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48211
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 10,000.00

37PMZ/0629bb
6/29/82

MIT270010069

Facility EPA I.D. Number

GMC FISHER BODY DIVISION DETROIT CENTRAL PLANT 37

Name of Facility

6051 HASTINGS

Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48211
City or Town	State	Zip Code

950 MILWAUKEE

Facility Location (Street, Route No. or other specific identifier)

DETROIT	WAYNE	MI	48211
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1,000.00

MID005356746

Facility EPA I.D. Number

GMC FISHER BODY DIVISION DETROIT CENTRAL PLANT 40

Name of Facility

6051 HASTINGS

Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48211
City or Town	State	Zip Code

1500 E MILWAUKEE

Facility Location (Street, Route No. or other specific identifier)

DETROIT	WAYNE	MI	48211
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1,000.00

37PMZ/0629cc
6/29/82

OHT400011086
Facility EPA I.D. Number

GMC FISHER BODY DIVISION ELYRIA PLANT
Name of Facility

PO BOX 4025
Facility Mailing Address (Street or P.O. Box)

ELYRIA	OH	44036
City or Town	State	Zip Code

1400 LOWELL ST
Facility Location (Street, Route No. or other specific identifier)

ELYRIA	LORAIN	OH	44036
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 2,154,600.00

OHD097622336
Facility EPA I.D. Number

GMC FISHER BODY DIVISION EUCLID PLANT
Name of Facility

20001 EUCLID AVE
Facility Mailing Address (Street or P.O. Box)

CLEVELAND	OH	44117
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	CUYAHOGA		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 27,500.00

37PMZ/0629dd
6/29/82

MID005356746

Facility EPA I.D. Number

GMC FISHER BODY DIVISION FLEETWOOD PLANT

Name of Facility

WEST FORT ST & WEST END AVE

Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48209
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 68,850.00

MID005356738

Facility EPA I.D. Number

GMC FISHER BODY DIVISION FLINT PLANT

Name of Facility

4300 S SAGINAW ST

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48557
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	GENESEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 250,000.00

37PMZ/0629ee
6/29/82

MID005356787
Facility EPA I.D. Number

GMC FISHER BODY DIVISION FORT ST PLANT
Name of Facility

6307 W FORT ST
Facility Mailing Address (Street or P.O. Box)

DETROIT	MI	48209
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 10,315.00

MID005356944
Facility EPA I.D. Number

GMC FISHER BODY DIVISION GRAND BLANC PLANT
Name of Facility

10800 S SAGINAW ST
Facility Mailing Address (Street or P.O. Box)

GRAND BLANC	MI	48439
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	GENESEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 26,300.00

37PMZ/0629ff
6/29/82

MID006020408
Facility EPA I.D. Number

GMC FISHER BODY DIVISION GRAND RAPIDS FAB PLANT
Name of Facility

300 36TH ST SW
Facility Mailing Address (Street or P.O. Box)

GRAND RAPIDS	MI	49508
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	KENT		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 10,000.00

MID006020416
Facility EPA I.D. Number

GMC FISHER BODY DIVISION GRAND RAPIDS TRIM PLANT
Name of Facility

2150 ALPINE AVE NW
Facility Mailing Address (Street or P.O. Box)

GRAND RAPIDS	MI	49504
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	KENT		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 15,280.00

37PMZ/0629gg
6/29/82

OHD004254355

Facility EPA I.D. Number

GMC FISHER BODY DIVISION HAMILTON PLANT

Name of Facility

PO BOX 778

Facility Mailing Address (Street or P.O. Box)

HAMILTON	OH	45012
City or Town	State	Zip Code

4400 DIXIE HWY

Facility Location (Street, Route No. or other specific identifier)

FAIRFIELD	BUTLER	OH	45014
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 27,200.00

MID001876663

Facility EPA I.D. Number

GMC FISHER BODY DIVISION KALAMAZOO PLANT

Name of Facility

5200 E COOK ST

Facility Mailing Address (Street or P.O. Box)

KALAMAZOO	MI	49002
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	KALAMAZOO		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 25,000.00

37PMZ/0629hh
6/29/82

MID005356928

Facility EPA I.D. Number

GMC FISHER BODY DIVISION LANSING PLANT

Name of Facility

401 VERLINDEN AVE

Facility Mailing Address (Street or P.O. Box)

LANSING	MI	48901
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	INGHAM		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 10,000.00

MID076331271

Facility EPA I.D. Number

GMC FISHER BODY DIVISION LIVONIA PLANT

Name of Facility

28400 PLYMOUTH RD

Facility Mailing Address (Street or P.O. Box)

LIVONIA	MI	48151
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WAYNE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 8,376.00

37PMZ/0629ii
6/29/82

OHD083321091

Facility EPA I.D. Number

GMC FISHER BODY DIVISION LORDSTOWN PLANT

Name of Facility

PO BOX 1427

Facility Mailing Address (Street or P.O. Box)

WARREN	OH	44482
City or Town	State	Zip Code

2369 ELLSWORTH-BAILEY RD

Facility Location (Street, Route No. or other specific identifier)

LORDSTOWN	TRUMBULL	OH	44482
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 5,630.00

OHD004200085

Facility EPA I.D. Number

GMC FISHER BODY DIVISION MANSFIELD PLANT

Name of Facility

PO BOX 2567

Facility Mailing Address (Street or P.O. Box)

MANSFIELD	OH	44906
City or Town	State	Zip Code

2525 W 4TH ST RD

Facility Location (Street, Route No. or other specific identifier)

MANSFIELD	RICHLAND	OH	44906
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 40,800.00

37PMZ/0629jj
6/29/82

IND000715086
Facility EPA I.D. Number

GMC FISHER BODY DIVISION MARION PLANT
Name of Facility

2400 W SECOND ST
Facility Mailing Address (Street or P.O. Box)

MARION	IN	46952
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	MARION		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 11,242.00

MID005356910
Facility EPA I.D. Number

GMC FISHER BODY DIVISION PONTIAC PLANT
Name of Facility

900 BALDWIN AVE
Facility Mailing Address (Street or P.O. Box)

PONTIAC	MI	48055
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	OAKLAND		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 16,592.00

37PMZ/0629kk
6/29/82

MID041512252
Facility EPA I.D. Number

GMC FISHER BODY DIVISION TECUMSEH PLANT
Name of Facility

5550 OCCIDENTAL HWY
Facility Mailing Address (Street or P.O. Box)

TECUMSEH	MI	49286
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	LENAWEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1,483.00

MIT270013006
Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION DETROIT PLANT
Name of Facility

800 STEPHENSEN HWY
Facility Mailing Address (Street or P.O. Box)

TROY	MI	48084
City or Town	State	Zip Code

2500 E GRAND BLVD
Facility Location (Street, Route No. or other specific identifier)

DETROIT	WAYNE	MI	48202
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 91,000.00

37PMZ/062911
6/29/82

MID000718544

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION LAKE ORION PLANT

Name of Facility

PO BOX 347

Facility Mailing Address (Street or P.O. Box)

LAKE ORION	MI	48035
City or Town	State	Zip Code

4555 GIDDINGS RD

Facility Location (Street, Route No. or other specific identifier)

LAKE ORION	OAKLAND	MI	48055
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 91,000.00

OHD020632998

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION LORDSTOWN PLANT

Name of Facility

PO BOX 1406

Facility Mailing Address (Street or P.O. Box)

WARREN	OH	44482
City or Town	State	Zip Code

2300 HALLOCK-YOUNG RD

Facility Location (Street, Route No. or other specific identifier)

LORDSTOWN	TRUMBULL	OH	44482
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 425,000.00

37PMZ/0629mm
6/29/82

OHD004260089

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION NORWOOD PLANT

Name of Facility

4726 SMITH RD

Facility Mailing Address (Street or P.O. Box)

NORWOOD	OH	45212
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	HAMILTON		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 187,000.00

MID005356795

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION WILLOW RUN PLANT

Name of Facility

2625 TYLER RD

Facility Mailing Address (Street or P.O. Box)

YPSILANTI	MI	48197
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WASHTENAW		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 989,945.00

37PMZ/0629nn
6/29/82

MID005356902
Facility EPA I.D. Number

GMC TRUCK AND COACH DIVISION PONTIAC EAST PLANT
Name of Facility

660 S BLVD E
Facility Mailing Address (Street or P.O. Box)

PONTIAC	MI	48053
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	OAKLAND		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 97,610.00

MIT270010127
Facility EPA I.D. Number

GMC TRUCK AND COACH DIVISION PONTIAC WEST PLANT
Name of Facility

660 S BLVD E
Facility Mailing Address (Street or P.O. Box)

PONTIAC	MI	48053
City or Town	State	Zip Code

275 FRANKLIN RD
Facility Location (Street, Route No. or other specific identifier)

PONTIAC	OAKLAND	MI	48053
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 26,435.00

37PMZ/0629oo
6/29/82

MID082220757

Facility EPA I.D. Number

GMC PROVING GROUND MILFORD

Name of Facility

HICKORY RIDGE & GM ROAD

Facility Mailing Address (Street or P.O. Box)

MILFORD	MI	48042
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	OAKLAND		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 15,065.00

MID064169154

Facility EPA I.D. Number

GENERAL MOTORS TECHNICAL CENTER

Name of Facility

30800 MOUND RD SERVICE SECTION

Facility Mailing Address (Street or P.O. Box)

WARREN	MI	48090
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	MACOMB		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 124,270.00

37PMZ/0629pp
6/29/82

OHD045719895

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION CLEVELAND FACILITY

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

12990 SNOW RD

Facility Location (Street, Route No. or other specific identifier)

PARMA	CUYAHOGA	OH	44130
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,000.00

MID003912920

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION DRAYTON PLAINS PLANT

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

5260 WILLIAMS LAKE RD

Facility Location (Street, Route No. or other specific identifier)

DRAYTON PLAINS	OAKLAND	MI	48020
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 50,000.00

37PMZ/0629qq
6/29/82

MID003906773

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION FLINT PLANT

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	GENESEE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 75,000.00

IND000803734

Facility EPA I.D. Number

GMC GUIDE DIVISION WEST PLANT

Name of Facility

2915 PENDLETON AVE

Facility Mailing Address (Street or P.O. Box)

ANDERSON	IN	46011
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	MADISON		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 239,600.00

37PMZ/0629rr
6/29/82

OHD017958604

Facility EPA I.D. Number

GMC HARRISON RADIATOR DIVISION DAYTON PLANT

Name of Facility

PO BOX 824

Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

300 TAYLOR ST

Facility Location (Street, Route No. or other specific identifier)

DAYTON	MONTGOMERY	OH	45401
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 26,900.00

OHD000817577

Facility EPA I.D. Number

GMC HARRISON RADIATOR DIVISION MORAINE PLANT

Name of Facility

PO BOX 824

Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

3600 DRYDEN RD

Facility Location (Street, Route No. or other specific identifier)

MORAINE	MONTGOMERY	OH	44439
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 40,080.00

CURRENT POST-CLOSURE COST ESTIMATE OF FACILITY $ 122,400.00

37PMZ/0629ss
6/29/82

GENERAL MO… CORPORATION FACILITIES - … PA REGION 5

MID000724740

Facility EPA I.D. Number

GMC HYDRA-MATIC DIVISION CONSTANTINE PLANT

Name of Facility

ONE HYDRA-MATIC DR

Facility Mailing Address (Street or P.O. Box)

THREE RIVERS	MI	49093
City or Town	State	Zip Code

INDUSTRIAL PARK

Facility Location (Street, Route No. or other specific identifier)

CONSTANTINE	ST JOSEPH	MI	49042
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,652.00

MID000718551

Facility EPA I.D. Number

GMC HYDRA-MATIC DIVISION THREE RIVERS PLANT

Name of Facility

ONE HYDRA-MATIC DR

Facility Mailing Address (Street or P.O. Box)

THREE RIVERS	MI	49093
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	ST JOSEPH		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 13,516.00

37PMZ/0629tt
6/29/82

MID005356811
Facility EPA I.D. Number

GMC HYDRA-MATIC DIVISION WARREN PLANT
Name of Facility

23500 MOUND RD
Facility Mailing Address (Street or P.O. Box)

WARREN	MI	48091
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	MACOMB		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 325,000.00

MIT270012560
Facility EPA I.D. Number

GMC HYDRA-MATIC DIVISION YPSILANTI PLANT
Name of Facility

WILLOW RUN
Facility Mailing Address (Street or P.O. Box)

YPSILANTI	MI	48197
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	WASHTENAW		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 6,717.00

37PMZ/0629uu
6/29/82

OHD000817023
Facility EPA I.D. Number

GMC INLAND DIVISION DAYTON PLANT
Name of Facility

PO BOX 1224
Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

2701 HOME AVE
Facility Location (Street, Route No. or other specific identifier)

DAYTON	MONTGOMERY	OH	45417
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 33,800.00

OHD052151701
Facility EPA I.D. Number

GMC INLAND DIVISION VANDALIA PLANT
Name of Facility

PO BOX 1224
Facility Mailing Address (Street or P.O. Box)

DAYTON	OH	45401
City or Town	State	Zip Code

480 N DIXIE DR
Facility Location (Street, Route No. or other specific identifier)

VANDALIA	MONTGOMERY	OH	45377
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 43,600.00

37PMZ/0629vv
6/29/82

OHD001880442

Facility EPA I.D. Number

GMC NEW DEPARTURE-HYATT BEARINGS DIVISION SANDUSKY PLANT

Name of Facility

2509 HAYES AVE

Facility Mailing Address (Street or P.O. Box)

SANDUSKY	OH	44870
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	ERIE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 223,500.00

MID005356894

Facility EPA I.D. Number

GMC OLDSMOBILE DIVISION PLANT 1

Name of Facility

920 TOWNSEND ST

Facility Mailing Address (Street or P.O. Box)

LANSING	MI	48921
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	INGHAM		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 197,949.00

37PMZ/0629ww
6/29/82

MIT270010556

Facility EPA I.D. Number

GMC OLDSMOBILE DIVISION PLANTS 2 & 3

Name of Facility

920 TOWNSEND ST

Facility Mailing Address (Street or P.O. Box)

LANSING	MI	48921
City or Town	State	Zip Code

W SAGINAW ST

Facility Location (Street, Route No. or other specific identifier)

LANSING	INGHAM	MI	48917
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 64,310.00

MIT270010564

Facility EPA I.D. Number

GMC OLDSMOBILE DIVISION PLANT 5

Name of Facility

920 TOWNSEND ST

Facility Mailing Address (Street or P.O. Box)

LANSING	MI	48921
City or Town	State	Zip Code

CANAL RD

Facility Location (Street, Route No. or other specific identifier)

LANSING	EATON	MI	48917
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 21,990.00

37PMZ/0629xx
6/29/82

OHD018414292
Facility EPA I.D. Number

GMC PACKARD ELECTRIC DIVISION WARREN CITY PLANT
Name of Facility

PO BOX 431
Facility Mailing Address (Street or P.O. Box)

WARREN	OH	44486
City or Town	State	Zip Code

408 DANA ST
Facility Location (Street, Route No. or other specific identifier)

WARREN	TRUMBULL	OH	44482
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 9,592.00

OHD000817346
Facility EPA I.D. Number

GMC PACKARD ELECTRIC DIVISION NORTH RIVER ROAD PLANTS
Name of Facility

PO BOX 431
Facility Mailing Address (Street or P.O. Box)

WARREN	OH	44486
City or Town	State	Zip Code

N RIVER RD AT LARCHMONT
Facility Location (Street, Route No. or other specific identifier)

WARREN	TRUMBULL	OH	44484
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 124,490.00

37PMZ/0630yy
6/30/82

GENERAL MOTORS CORPORATION FACILITIES - U.S. EPA REGION 5

MID005356886

Facility EPA I.D. Number

GMC PONTIAC MOTOR DIVISION PONTIAC PLANT

Name of Facility

1 PONTIAC PLAZA

Facility Mailing Address (Street or P.O. Box)

PONTIAC	MI	48053
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	OAKLAND		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 25,000.00

MID017079625

Facility EPA I.D. Number

GMC ROCHESTER PRODUCTS DIVISION GRAND RAPIDS PLANT

Name of Facility

2100 BURLINGAME

Facility Mailing Address (Street or P.O. Box)

GRAND RAPIDS	MI	49501
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	KENT		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 37,210.00

37PMZ/0630zz
6/30/82

MID005356878

Facility EPA I.D. Number

GMC SAGINAW STEERING GEAR DIVISION HOLLAND COMPLEX PLANTS

Name of Facility

3900 HOLLAND AVE

Facility Mailing Address (Street or P.O. Box)

SAGINAW	MI	48605
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	SAGINAW		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 44,500.00

MID003937026

Facility EPA I.D. Number

GMC SAGINAW STEERING GEAR DIVISION PLANT 1

Name of Facility

3900 HOLLAND AVE

Facility Mailing Address (Street or P.O. Box)

SAGINAW	MI	48605
City or Town	State	Zip Code

628 N HAMILTON ST

Facility Location (Street, Route No. or other specific identifier)

SAGINAW	SAGINAW	MI	48602
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 7,500.00

37PMZ/0630a
6/30/82

MID990760282

Facility EPA I.D. Number

GMC SAGINAW STEERING GEAR DIVISION PLANT 2

Name of Facility

3900 HOLLAND AVE

Facility Mailing Address (Street or P.O. Box)

SAGINAW	MI	48605
City or Town	State	Zip Code

1400 HOLMES ST

Facility Location (Street, Route No. or other specific identifier)

SAGINAW	SAGINAW	MI	48602
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 11,200.00

MID000721738

Facility EPA I.D. Number

GMC ROCHESTER PRODUCTS DIVISION COOPERSVILLE PLANT

Name of Facility

2100 BURLINGAME

Facility Mailing Address (Street or P.O. Box)

GRAND RAPIDS	MI	49501
City or Town	State	Zip Code

999 RANDALL

Facility Location (Street, Route No. or other specific identifier)

COOPERSVILLE	OTTAWA	MI	49404
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1000.00

37PMZ/0630b
6/30/82

MOT300010733
Facility EPA I.D. Number

GMC ELECTRO-MOTIVE DIVISION HAZELWOOD PLANT 1
Name of Facility

9301 W 55TH ST DEPT 1400
Facility Mailing Address (Street or P.O. Box)

LA GRANGE	IL	60525
City or Town	State	Zip Code

133 BROWN ROAD BUILDING 1
Facility Location (Street, Route No. or other specific identifier)

HAZELWOOD	ST LOUIS	MO	63042
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 131,215.00

MOD045729159
Facility EPA I.D. Number

GMC ELECTRO-MOTIVE DIVISION HAZELWOOD PLANT 2
Name of Facility

9301 W 55TH ST DEPT 1400
Facility Mailing Address (Street or P.O. Box)

LA GRANGE	IL	60525
City or Town	State	Zip Code

163 BROWN ROAD BUILDING 2
Facility Location (Street, Route No. or other specific identifier)

HAZELWOOD	ST LOUIS	MO	63043
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 74,256.00

37PMZ/0630c
6/30/82

MOD000822668

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION LEEDS PLANT

Name of Facility

6817 STADIUM DR

Facility Mailing Address (Street or P.O. Box)

KANSAS CITY	MO	64129
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	JACKSON		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 30,000.00

MOD006290118

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION ST LOUIS PLANT

Name of Facility

3809 UNION BLVD

Facility Mailing Address (Street or P.O. Box)

ST LOUIS	MO	63115
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	ST LOUIS		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 116,700.00

37PMZ/0630d
6/30/82

MOT300010261

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION WENTZVILLE PLANT

Name of Facility

PO BOX 444

Facility Mailing Address (Street or P.O. Box)

WENTZVILLE	MO	63385
City or Town	State	Zip Code

MEXICO & EDINGER RD

Facility Location (Street, Route No. or other specific identifier)

WENTZVILLE	ST CHARLES	MO	63385
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 91,000.00

MOD051728905

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION ST LOUIS FACILITY

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

5801 N. LINDBERGH RD

Facility Location (Street, Route No. or other specific identifier)

HAZELWOOD	ST LOUIS	MO	63042
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,000.00

37PMZ/0630e
6/30/82

AZD020122479

Facility EPA I.D. Number

GMC DESERT PROVING GROUND MESA

Name of Facility

PO BOX 1506

Facility Mailing Address (Street or P.O. Box)

MESA	AZ	85201
City or Town	State	Zip Code

13303 S ELLSWORTH RD

Facility Location (Street, Route No. or other specific identifier)

MESA	MARICOPA	AZ	85208
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 7,000.00

~~*~~

~~Facility EPA I.D. Number~~

~~*~~

~~Name of Facility~~

~~*~~

~~Facility Mailing Address (Street or P.O. Box)~~

~~*~~

~~City or Town~~	~~State~~	~~Zip Code~~

~~*~~

~~Facility Location (Street, Route No. or other specific identifier)~~

~~*~~

~~City or Town~~	~~County~~	~~State~~	~~Zip Code~~

~~CURRENT CLOSURE COST ESTIMATE OF FACILITY $*~~

~~CURRENT POST-CLOSURE COST ESTIMATE OF FACILITY $*~~

37PMZ/0630f
6/30/82

ATTACHMENT B

MAD019369602
Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION FRAMINGHAM PLANT
Name of Facility

63 WESTERN AVE
Facility Mailing Address (Street or P.O. Box)

FRAMINGHAM	MA	01701
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	MIDDLESEX		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 16,220.00

CTD018625632
Facility EPA I.D. Number

GMC NEW DEPARTURE-HYATT BEARINGS DIVISION BRISTOL PLANT
Name of Facility

780 JAMES P. CASEY RD
Facility Mailing Address (Street or P.O. Box)

BRISTOL	CT	06010
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	HARTFORD		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 669,750.00

37MPZ/0628
6/28/82

VAD091222588
Facility EPA I.D. Number

GMC DELCO MORAINE DIVISION FREDERICKSBURG PLANT
Name of Facility

3401 TIDEWATER TRAIL
Facility Mailing Address (Street or P.O. Box)

FREDERICKSBURG	VA	22401
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	SPOTSYLVANIA		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 22,200.00

MDD063214779
Facility EPA I.D. Number

GMC ELECTRO-MOTIVE DIVISION HALETHORPE PLANT
Name of Facility

9301 W 55TH ST DEPT 1400
Facility Mailing Address (Street or P.O. Box)

LA GRANGE	IL	60525
City or Town	State	Zip Code

4701 WASHINGTON BLVD
Facility Location (Street, Route No. or other specific identifier)

HALETHORPE	BALTIMORE	MD	21227
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 157,985.00

37MPZ/0628a
6/28/82

PAD000800490
Facility EPA I.D. Number

GMC FISHER BODY DIVISION PITTSBURGH PLANT
Name of Facility

PO BOX 158
Facility Mailing Address (Street or P.O. Box)

McKEESPORT	PA	15134
City or Town	State	Zip Code

1451 LEBANON SCHOOL RD
Facility Location (Street, Route No. or other specific identifier)

W MIFFLIN BOROUGH	ALLEGENY	PA	15122
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 22,492.00

MDD003091972
Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION BALTIMORE PLANT
Name of Facility

2122 BROENING HWY
Facility Mailing Address (Street or P.O. Box)

BALTIMORE	MD	21203
City or Town	State	Zip Code

SAME AS ABOVE
Facility Location (Street, Route No. or other specific identifier)

	BALTIMORE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 132,000.00

37MPZ/0628f
6/28/82

DED002369205

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION WILMINGTON PLANT

Name of Facility

PO BOX 1512

Facility Mailing Address (Street or P.O. Box)

WILMINGTON	DE	19899
City or Town	State	Zip Code

BOXWOOD RD

Facility Location (Street, Route No. or other specific identifier)

WILMINGTON	NEW CASTLE	DE	19899
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 177,858.00

PAD980555072

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION PHILADELPHIA FACILITY

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

EXP 95 IND CTR PROG DR AND WINKS LANE

Facility Location (Street, Route No. or other specific identifier)

BENSALEM	BUCKS	PA	19020
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,000.00

37MPZ/0628b
6/28/82

PAD074978792

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION PITTSBURGH FACILITY

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

RUSSELTON RD

Facility Location (Street, Route No. or other specific identifier)

CHESWICK	ALLEGHENY	PA	15024
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,000.00

*

Facility EPA I.D. Number

*

Name of Facility

*

Facility Mailing Address (Street or P.O. Box)

*

City or Town	State	Zip Code

*

Facility Location (Street, Route No. or other specific identifier)

*

City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $*

37MPZ/0628c
6/28/82

GENERAL MC . OI ... CORPORATION FACILITIES '.' :PA REGION 4

GAD092375377

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION ALBANY PLANT

Name of Facility

PO BOX 3210

Facility Mailing Address (Street or P.O. Box)

ALBANY	GA	31706
City or Town	State	Zip Code

601 HOLLY DR

Facility Location (Street, Route No. or other specific identifier)

ALBANY	DOUGHERTY	GA	31705
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 40,000.00

GAD075942706

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION FITZGERALD PLANT

Name of Facility

PERRYHOUSE RD

Facility Mailing Address (Street or P.O. Box)

FITZGERALD	GA	31750
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	BEN HILL		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 32,700.00

37MPZ/0628d
6/28/82

GENERAL MO.. .F.. CORPORATION FACILITIES - S PA REGION 4

MSD083451039

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION LAUREL PLANT

Name of Facility

PO BOX 1981

Facility Mailing Address (Street or P.O. Box)

LAUREL	MS	39440
City or Town	State	Zip Code

ONE THAMES AVE

Facility Location (Street, Route No. or other specific identifier)

LAUREL	JONES	MS	39440
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 16,000.00

MSD040663510

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION MERIDIAN PLANT

Name of Facility

PO BOX 4396

Facility Mailing Address (Street or P.O. Box)

MERIDIAN	MS	39301
City or Town	State	Zip Code

LAUDERDALE INDUSTRIAL PARK

Facility Location (Street, Route No. or other specific identifier)

MERIDIAN	LAUDERDALE	MS	39301
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 16,500.00

37MPZ/0628e
6/28/82

FLD079201273

Facility EPA I.D. Number

GMC ELECTRO-MOTIVE DIVISION JACKSONVILLE PLANT

Name of Facility

9301 W 55TH ST DEPT 1400

Facility Mailing Address (Street or P.O. Box)

LA GRANGE	IL	60525
City or Town	State	Zip Code

3545 NEW KINGS RD

Facility Location (Street, Route No. or other specific identifier)

JACKSONVILLE	DUVAL	FL	33209
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 112,250.00

KYT000622993

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION BOWLING GREEN PLANT

Name of Facility

PO BOX Q

Facility Mailing Address (Street or P.O. Box)

BOWLING GREEN	KY	42101
City or Town	State	Zip Code

I6S AT HWY 31 W

Facility Location (Street, Route No. or other specific identifier)

BOWLING GREEN	WARREN	KY	42101
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 32,000.00

37MPZ/0628g
6/28/82

GENERAL MOTORS CORPORATION FACILITIES - U.S. EPA REGION 4

GAD003310810

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION DORAVILLE PLANT

Name of Facility

3900 MOTORS INDUSTRIAL WAY

Facility Mailing Address (Street or P.O. Box)

DORAVILLE	GA	30360
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	DEKALB		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 44,000.00

GAD059522870

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION LAKEWOOD PLANT

Name of Facility

PO BOX 16505

Facility Mailing Address (Street or P.O. Box)

ATLANTA	GA	30321
City or Town	State	Zip Code

510 SAWTELL AVE SE

Facility Location (Street, Route No. or other specific identifier)

ATLANTA	FULTON	GA	30315
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 120,000.00

37MPZ/0628h
6/28/82

GAD000814343

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION ATLANTA FACILITY

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

4060 MOTORS INDUSTRIAL WAY

Facility Location (Street, Route No. or other specific identifier)

DORAVILLE	KEKALB	GA	30360
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,000.00

MSD084668367

Facility EPA I.D. Number

GMC PACKARD ELECTRIC DIVISION BROOKHAVEN PLANT

Name of Facility

PO BOX 431

Facility Mailing Address (Street or P.O. Box)

WARREN	OH	44486
City or Town	State	Zip Code

INDUSTRIAL PARK RD

Facility Location (Street, Route No. or other specific identifier)

BROOKHAVEN	LINCOLN	MS	39601
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 5,951.00

37MPZ/0628i
6/28/82

MSD065462517

Facility EPA I.D. Number

GMC PACKARD ELECTRIC DIVISION CLINTON PLANT

Name of Facility

PO BOX 431

Facility Mailing Address (Street or P.O. Box)

WARREN	OH	44486
City or Town	State	Zip Code

CLINTON INDUSTRIAL PARK

Facility Location (Street, Route No. or other specific identifier)

CLINTON	HINDS	MS	39056
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 66,272.00

ALD097751317

Facility EPA I.D. Number

GMC ROCHESTER PRODUCTS DIVISION TUSCALOOSA PLANT

Name of Facility

3440 KAULOOSA AVE

Facility Mailing Address (Street or P.O. Box)

TUSCALOOSA	AL	35401
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	TUSCALOOSA		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 35,100.00

37MPZ/0628j
6/28/82

ALD078960234

Facility EPA I.D. Number

GMC SAGINAW STEERING GEAR DIVISION ATHENS PLANT

Name of Facility

PO BOX 311

Facility Mailing Address (Street or P.O. Box)

ATHENS	AL	35611
City or Town	State	Zip Code

US HIGHWAY 31 NORTH

Facility Location (Street, Route No. or other specific identifier)

ATHENS	LIMESTONE	AL	35611
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 118,340.00

*

Facility EPA I.D. Number

*

Name of Facility

*

Facility Mailing Address (Street or P.O. Box)

*

City or Town	State	Zip Code

*

Facility Location (Street, Route No. or other specific identifier)

*

City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $*

37MPZ/0628k
6/28/82

ILD005141551
Facility EPA I.D. Number

GMC CENTRAL FOUNDRY DIVISION DANVILLE PLANT
Name of Facility

PO BOX 592
Facility Mailing Address (Street or P.O. Box)

DANVILLE	IL	61832
City or Town	State	Zip Code

NORTH H ST
Facility Location (Street, Route No. or other specific identifier)

TILTON	VERMILION	IL	61832
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 725,000.00

ILD005154943
Facility EPA I.D. Number

GMC ELECTRO-MOTIVE DIVISION CHICAGO PLANT
Name of Facility

9301 W 55TH ST DEPT 1400
Facility Mailing Address (Street or P.O. Box)

LA GRANGE	IL	60525
City or Town	State	Zip Code

900 E 103RD ST
Facility Location (Street, Route No. or other specific identifier)

CHICAGO	COOK	IL	60628
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 345,592.00

37MPZ/06281
6/28/82

ILD006009690

Facility EPA I.D. Number

GMC ELECTRO-MOTIVE DIVISION LA GRANGE PLANT

Name of Facility

9301 W 55TH ST DEPT 1400

Facility Mailing Address (Street or P.O. Box)

LA GRANGE	IL	60525
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	COOK		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1,501,093.00

ILD005231485

Facility EPA I.D. Number

GMC FISHER BODY DIVISION CHICAGO PLANT

Name of Facility

79TH & WILLOW SPRINGS RD

Facility Mailing Address (Street or P.O. Box)

WILLOW SPRINGS	IL	60480
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	COOK		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 52,000.00

37PMZ/0628m
6/28/82

ILD068603604

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION CHICAGO FACILITY

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

2600 S 25TH AVE

Facility Location (Street, Route No. or other specific identifier)

BROADVIEW	COOK	IL	60153
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,000.00

*

Facility EPA I.D. Number

*

Name of Facility

*

Facility Mailing Address (Street or P.O. Box)

*

City or Town State Zip Code

*

Facility Location (Street, Route No. or other specific identifier)

*

City or Town County State Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $*

37MPZ/0628n
6/28/82

TXD095217204

Facility EPA I.D. Number

GMC AC SPARK PLUG DIVISION WICHITA FALLS PLANT

Name of Facility

PO BOX AC

Facility Mailing Address (Street or P.O. Box)

WICHITA FALLS	TX	76307
City or Town	State	Zip Code

8600 CENTRAL FREEWAY NORTH

Facility Location (Street, Route No. or other specific identifier)

WICHITA FALLS	WICHITA	TX	76306
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 5,500.00

TXD008018004

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION ARLINGTON PLANT

Name of Facility

2525 EAST ABRAM

Facility Mailing Address (Street or P.O. Box)

ARLINGTON	TX	76010
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	TARRANT		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 420,000.00

37PMZ/0628o
6/28/82

OKD082565714

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION OKLAHOMA CITY PLANT

Name of Facility

PO BOX 26527

Facility Mailing Address (Street or P.O. Box)

OKLAHOMA CITY	OK	73126
City or Town	State	Zip Code

7447 SE 74TH ST

Facility Location (Street, Route No. or other specific identifier)

OKLAHOMA CITY	OAKLAHOMA	OK	73134
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 420,000.00

LAD089317341

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION SHREVEPORT PLANT

Name of Facility

PO BOX 30011

Facility Mailing Address (Street or P.O. Box)

SHREVEPORT	LA	71129
City or Town	State	Zip Code

7600 GM BLVD

Facility Location (Street, Route No. or other specific identifier)

SHREVEPORT	CADDO	LA	71130
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 331,000.00

37PMZ/0628p
6/28/82

TXD068994255

Facility EPA I.D. Number

GMC GM WAREHOUSING & DIST DIVISION DALLAS FACILITY

Name of Facility

6060 W BRISTOL RD

Facility Mailing Address (Street or P.O. Box)

FLINT	MI	48554
City or Town	State	Zip Code

8635 STEMMONS FREEWAY

Facility Location (Street, Route No. or other specific identifier)

DALLAS	DALLAS	TX	75247
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,000.00

LAD067033944

Facility EPA I.D. Number

GMC GUIDE DIVISION MONROE PLANT

Name of Facility

PO BOX 4707

Facility Mailing Address (Street or P.O. Box)

MONROE	LA	71203
City or Town	State	Zip Code

INTERSTATE I20 & MILLHAVEN RD

Facility Location (Street, Route No. or other specific identifier)

MONROE	OUACHITA	LA	71203
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 20,822.00

37PMZ/0628q
6/28/82

KSD007145907

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION OLATHE PLANT

Name of Facility

400 W DENNIS AVE

Facility Mailing Address (Street or P.O. Box)

OLATHE	KS	66061
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	JOHNSON		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 5,500.00

KSD007145899

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION FAIRFAX PLANT

Name of Facility

100 KINDELBERGER RD

Facility Mailing Address (Street or P.O. Box)

KANSAS CITY	KS	66115
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	WYANDOTTE		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 417,200.00

37PMZ/0628r
6/28/82

KST210010476

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION KANSAS CITY PLANT*

Name of Facility

800 STEPHENSON HWY

Facility Mailing Address (Street or P.O. Box)

City or Town	State	Zip Code
TROY	MI	48084

110TH & STATE STS

Facility Location (Street, Route No. or other specific identifier)

City or Town	County	State	Zip Code
KANSAS CITY	WYANDOTTE	KS	66111

*RCRA PART A APPLICATION FILED - SITE NOT DEVELOPED

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 0

IAD000686899

Facility EPA I.D. Number

GMC ROCHESTER PRODUCTS DIVISION SIOUX CITY PLANT

Name of Facility

1805 ZENITH DR

Facility Mailing Address (Street or P.O. Box)

City or Town	State	Zip Code
SIOUX CITY	IA	51103

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

City or Town	County	State	Zip Code
	WOODBURY		

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 3,850.00

37PMZ/0628s
6/28/82

CAD009305848

Facility EPA I.D. Number

GMC DELCO ELECTRONICS DIVISION SANTA BARBARA PLANT

Name of Facility

700 E FIRMIN ST

Facility Mailing Address (Street or P.O. Box)

KOKOMO	IN	46902
City or Town	State	Zip Code

6767 HOLLISTER AVE

Facility Location (Street, Route No. or other specific identifier)

GOLETA	SANTA BARBARA	CA	93017
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 12,000.00

CAD008323396

Facility EPA I.D. Number

GMC DELCO-REMY DIVISION ANAHEIM PLANT

Name of Facility

PO BOX 3190

Facility Mailing Address (Street or P.O. Box)

ANAHEIM	CA	92803
City or Town	State	Zip Code

1201 MAGNOLIA AVE

Facility Location (Street, Route No. or other specific identifier)

ANAHEIM	ORANGE	CA	92801
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 12,000.00

37PMZ/0628t
6/28/82

CAD088396056

Facility EPA I.D. Number

GMC ELECTRO-MOTIVE DIVISION COMMERCE PLANT

Name of Facility

9301 W 55TH ST DEPT 1400

Facility Mailing Address (Street or P.O. Box)

LA GRANGE	IL	60525
City or Town	State	Zip Code

5928 S MALT AVE

Facility Location (Street, Route No. or other specific identifier)

COMMERCE	LOS ANGELES	CA	90040
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 150,045.00

CAD000051433

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION FREMONT PLANT

Name of Facility

45500 FREMONT BLVD

Facility Mailing Address (Street or P.O. Box)

FREMONT	CA	94537
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	ALAMEDA		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 1,285,000.00

37PMZ/0628u
6/28/82

CAD008295719

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION SOUTH GATE PLANT

Name of Facility

2700 TWEEDY BLVD

Facility Mailing Address (Street or P.O. Box)

SOUTH GATE	CA	90280
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	LOS ANGELES		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 95,000.00

CAD000051458

Facility EPA I.D. Number

GMC GM ASSEMBLY DIVISION VAN NUYS PLANT

Name of Facility

8000 VAN NUYS BLVD

Facility Mailing Address (Street or P.O. Box)

VAN NUYS	CA	91409
City or Town	State	Zip Code

SAME AS ABOVE

Facility Location (Street, Route No. or other specific identifier)

	LOS ANGELES		
City or Town	County	State	Zip Code

CURRENT CLOSURE COST ESTIMATE OF FACILITY $ 114,000.00

37PMZ/0628v
6/28/82

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

MAR 2 6 1987

REPLY TO THE ATTENTION OF:
5HE-12

MID 980 568 620

General Motors Corporation
General Motors Building
3044 W. Grand Boulevard
Detroit, Michigan 48202

Re: RCRA Financial Responsibility

Dear Owner/Operator:

On October 30, 1986, the State of Michigan was granted final authorization by the Administrator of the United States Environmental Protection Agency (U.S. EPA) to administer a hazardous waste program in lieu of the Federal program. As a result of final authorization, Michigan is required to enforce the provisions of the Resource Conservation and Recovery Act (RCRA). One of these provisions (40 CFR Part 265, Subpart H) requires all hazardous waste facilities to demonstrate financial responsibility for liability coverage and closure/post-closure care.

To implement this aspect of authorization, financial documents must be written to satisfy the requirements of the Michigan Administrative Code 1985 AACS, Part 7, which is the Michigan equivalent of 40 CFR Part 265, Subpart H. This letter is to notify you that your financial test should be updated and sent to the Director of the Michigan Department of Natural Resources within 90 days after the close of your fiscal year.

If you have any questions or desire additional information, please contact Ms. Sharon Johnson at (312) 886-4581 or Ronald Brown at (312) 353-7921.

Sincerely yours,

Wm. E. Muno

William E. Muno, Chief
RCRA Enforcement Section

cc: John Bohunsky, MDNR

U.S. EPA ID #: MID00072[illegible]

GMC ROCHESTER PROD DIV COOPERSVILL*
2100 BURLINGAME
[illegible]AND RAPIDS MI 49501

U.S. EPA ID #: MID003912920

GMC WHS & DIST DIV DRAYTON PLAINS
6060 W BRISTOL ROAD
FLINT MI 48554

U.S. EPA ID #: MID980700827

GMC OLDSMOBILE DIV PLTS 2 & 3
P O BOX 30061
LANSING MI 48909

U.S. EPA ID #: MID017079625

GMC ROCHESTER PROD DIV WYOMING PLT
2100 BURLINGAME
GRAND RAPIDS MI 49501

U.S. EPA ID #: MID005356902

GMC TRUCK & BUS GROUP
660 S BLVD E
PONTIAC MI 48053

U.S. EPA ID #: MID003906773

GMC WHS & DIST DIV FLINT
6060 W BRISTOL ROAD
FLINT MI 48554

U.S. EPA ID #: MID0053566?0 ✓

GMC FISHER BODY DIV COLDWATER RD
1245 E COLDWATER RD
FLINT MI 48559

U.S. EPA ID #: MID005356787 ✓

GMC FISHER BODY DIV FORT ST
6307 WEST FORT STREET
DETROIT MI 48209

U.S. EPA ID #: MID000718544 ✓

GMC GMAD LAKE ORION TWP PLT
PO BOX 347
LAKE ORION MI 48035

U.S. EPA ID #: MID000724740 ✓

GMC HYDRA-MATIC DIV
ONE HYDRA-MATIC DRIVE
THREE RIVERS MI 49093

U.S. EPA ID #: MID005356704 ✓

GMC CADILLAC MOTOR CAR CLARK PLT
2860 CLARK ST
DETROIT MI 48232

U.S. EPA ID #: MID000718551 ✓

GMC HYDRA-MATIC DIV THREE RIVERS P*
ONE HYDRA-MATIC DR
THREE RIVERS MI 49093

U.S. EPA ID #: MID005356688 ✓

GMC CHEVROLET BAY CITY
100 FITZGERALD ST
BAY CITY MI 48706

U.S. EPA ID #: MID005356694 ✓

GMC OLDSMOBILE DIV PLT 1
P O BOX 30061
LANSING MI 48909

U.S. EPA ID #: MID086744802 ✓

GMC CHEVROLET DETROIT GEAR AND AXLE
1840 HOLBROOK AVE
DETROIT MI 48212

U.S. EPA ID #: MID082220757 ✓

GMC PROVING GROUND MILFORD
HICKORY RIDGE & GM ROADS
MILFORD MI 48042

U.S. EPA ID #: MID005356621 ✓

GMC CHEVROLET LIVONIA
13000 ECKLES RD
LIVONIA MI 48151

U.S. EPA ID #: MID980568836 ✓

GMC TRUCK & COACH DIV PONTIAC WEST
660 S BLVD E
PONTIAC MI 48053

U.S. EPA ID #: MID005356803 ✓

GMC DETROIT DIESEL ALLISON DIV RED*
13400 WEST OUTER DR
DETROIT MI 48239

U.S. EPA ID #: MID980700843 ✓

GMC OLDSMOBILE DIV PLT 5
P O BOX 30061
LANSING MI 48909

U.S. EPA ID #: MID980568) ✓

GMC AC SPARK PLUG DIV DAVISON ENG
1300 NORTH DORT HIGHWAY
INT MI 48556

U.S. EPA ID #: MID005356647 ✓

GMC AC SPARK PLUG DIV DORT HWY
1300 N DORT HWY
FLINT MI 48556

U.S. EPA ID #: MID980568570 ✓

GMC AC SPARK PLUG DIV WASTE TRMT
1300 N DORT HIGHWAY
FLINT MI 48556

U.S. EPA ID #: MID005356795

GMC ASSEMBLY DIV ✓
2625 TYLER ROAD
YPSILANTI MI 48197

U.S. EPA ID #: MID005356696 ✓

GMC CENTRAL FOUNDRY DIV SAG MAL IR*
77 W CENTER ST
SAGINAW MI 48605

U.S. EPA ID #: MID076380583 ✓

GMC CHEVROLET DETROIT ASSEMBLY
601 PIQUETTE
DETROIT MI 48202

U.S. EPA ID #: MID005356654 ✓

GMC CHEVROLET FLINT MFG
300 NORTH CHEVROLET AVENUE
FLINT MI 48555

U.S. EPA ID MID041793340 ✓

GMC CHEVROLET SAGINAW CASTING & PA*
2100 VETERANS MEMORIAL PARKWAY
SAGINAW MI 48601

U.S. EPA ID #: MID000809905 ✓

GMC DETROIT DIESEL ALLISON ROMULUS*
36880 ECORSE RD
ROMULUS MI 48174

U.S. EPA ID #: MID005356712 ✓

GMC BUICK MOTOR DIV
902 E HAMILTON ST BLDG 85
FLINT MI 48550

U.S. EPA ID #: MID084571256 ✓

GMC CHEVROLET ADRIAN MFG
1450 E BEECHER ST
ADRIAN MI 49221

U.S. EPA ID #: MID020105565 ✓

GMC CHEVROLET DETROIT FORGE
8435 ST AUBIN
DETROIT MI 48212

U.S. EPA ID #: MID005356951 ✓

GMC CHEVROLET FLINT VAN SLYKE COMP*
G-3248 VAN SLYKE RD
FLINT MI 48552

U.S. EPA ID #: MID005356845 ✓

GMC CHEVROLET SAGINAW MFG
2328 EAST GENESEE AVE
SAGINAW MI 48605

Deloitte
Haskins+Sells

1114 Avenue of the Americas
New York, New York 10036
(212) 790-0500
Telex 12267

General Motors Corporation:

We have examined the consolidated balance sheet of General Motors Corporation and consolidated subsidiaries as of December 31, 1981, and the related statements of consolidated income and changes in consolidated financial position for the year then ended and have issued our opinion thereon dated February 8, 1982. We have not performed any auditing procedures beyond the date of our opinion on the financial statements; accordingly, this report is based on our knowledge as of that date and should be read with that understanding. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

At your request, we have performed the procedures enumerated below with respect to the accompanying letter from Mr. F. A. Smith to the Regional Administrator - Environmental Protection Agency dated July 2, 1982. It is understood that this report is solely for filing with the Environmental Protection Agency in accordance with requirements of the Resource Conservation and Recovery Act, and is not to be used for any other purpose. The procedures that we performed are summarized as follows:

1. We compared the amounts included in items 6, 7, 8 and 11 under the caption Alternative I in the letter referred to above with the corresponding amounts in the financial statements referred to in the first paragraph.

2. We recomputed from, or reconciled to, the financial statements referred to in the first paragraph the information included in items 4, 5, 10 and 15 under the caption Alternative I in the letter referred to above.

Because the procedures referred to in the preceding paragraph were not sufficient to constitute an examination made in accordance with generally accepted auditing standards, we do not express an opinion on any of the information or amounts listed under the caption Alternative I in the aforementioned letter. In performing the procedures referred to above, however, no matters came to our attention that caused us to believe that the information or amounts included in items 4, 5, 6, 7, 8, 10, 11 and 15 should be adjusted.

Deloitte Haskins + Sells

July 2, 1982

GENERAL MOTORS CORPORATION

Mr. Valdas Adamkus
Regional Administrator
U.S. EPA Region 5
230 S Dearborn
Chicago, IL 60604

Dear Mr. Adamkus:

I am the chief financial officer of General Motors Corporation, 3044 West Grand Boulevard, Detroit, Michigan 48202. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Subpart H of 40 CFR Parts 264 and 265.

The owner or operator identified above is the owner or operator of the following facilities for which liability coverage is being demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265. See Attachment A.

1. The owner or operator identified above owns or operates the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by the test are shown for each facility. See Attachment A.

2. The owner or operator identified above guarantees, through the corporate guarantee specified in Subpart H of 40 CFR Parts 264 and 265, the closure and post-closure care of the following facilities owned or operated by its subsidiaries. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility. None.

3. In States where EPA is not administering the financial requirements of Subpart H of 40 CFR Parts 264 and 265, this owner or operator is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by such a test are shown for each facility. None.

4. The owner or operator identified above owns or operates the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanism specified in Subpart H of 40 CFR Parts 264 and 265 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility. See Attachment B.

This owner or operator is required to file a Form 10-K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this owner or operator ends on December 31. The figures for the following items marked with an asterisk are derived from this owner's or operator's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 1981.

Alternative I
($ in millions)

1.	Sum of current closure and post-closure cost estimates (total of all cost estimates listed above)	$ 33.5
2.	Amount of annual aggregate liability coverage to be demonstrated	$ 2.0
3.	Sum of lines 1 and 2	$ 35.5
*4.	Total liabilities (if any portion of your closure or post-closure cost estimates is included in your total liabilities, you may deduct that portion from this line and add that amount to lines 5 and 6)	$ 21,270.1
*5.	Tangible net worth	$ 17,716.9
*6.	Net worth	$ 17,721.1
*7.	Current assets	$ 13,716.1
*8.	Current liabilities	$ 12,555.1
9.	Net working capital (line 7 minus line 8)	$ 1,161.0
*10.	The sum of net income plus depreciation, depletion, and amortization	$ 4,739.6
*11.	Total assets in U.S. (required only if less than 90% of assets are located in the U.S.)	$ 27,510.8

		Yes	No
12.	Is line 5 at least $10 million?	X	
13.	Is line 5 at least 6 times line 3?	X	
14.	Is line 9 at least 6 times line 3?	X	
*15.	Are at least 90% of assets located in the U.S.? If not, complete line 16.		X
16.	Is line 11 at least 6 times line 3?	X	
17.	Is line 4 divided by line 6 less than 2.0?	X	
18.	Is line 10 divided by line 4 greater than 0.1?	X	
19.	Is line 7 divided by line 8 greater than 1.5?		X

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151(g) as such regulations were constituted on the date shown immediately below.

F. A. Smith
Executive Vice President
7/2/82